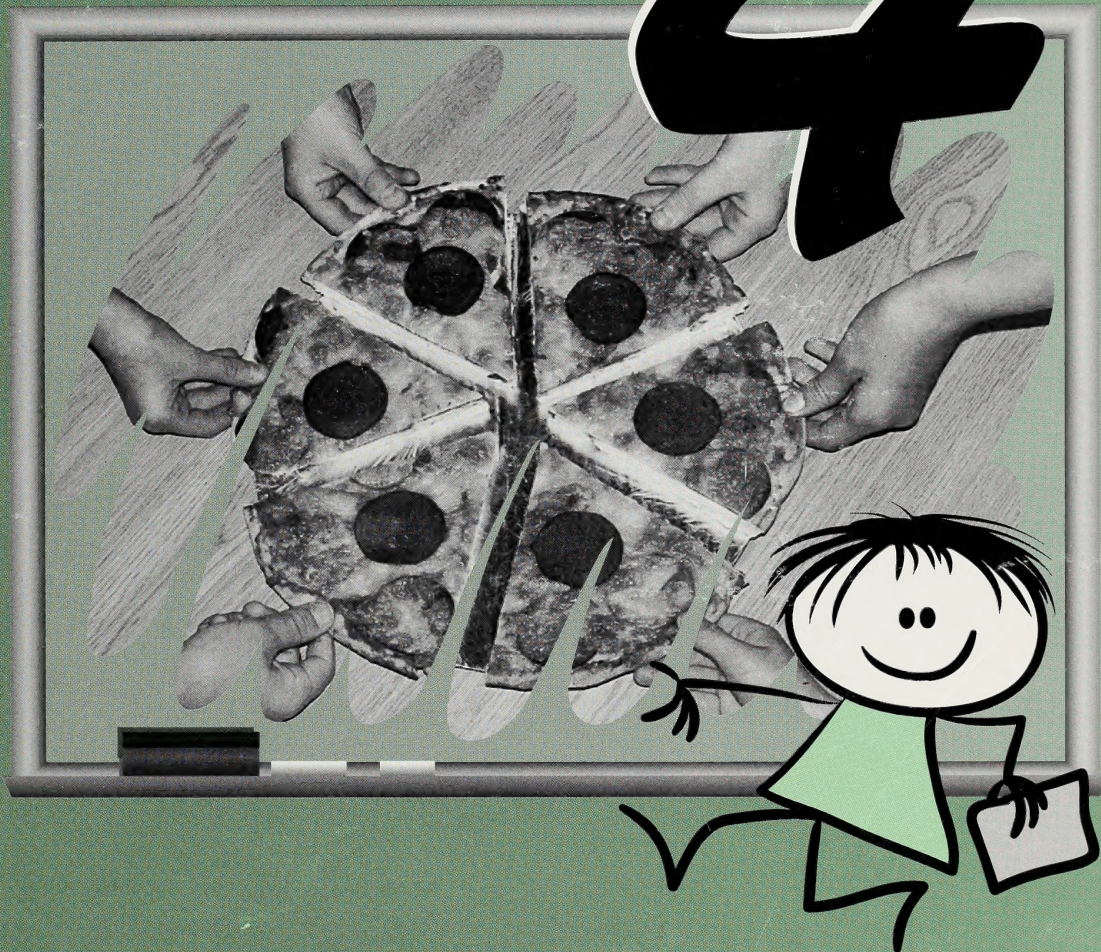



Mathematics

Module 3

4



Fractions and Decimals

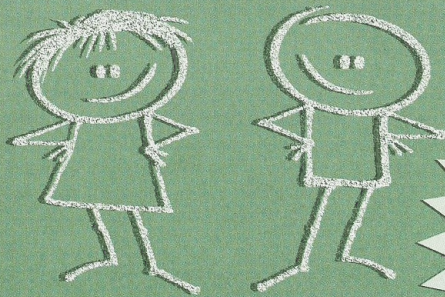


Digitized by the Internet Archive
in 2016 with funding from
University of Alberta Libraries

<https://archive.org/details/mathematics403albe>

Mathematics 4

Module 3 Fractions and Decimals



Note
A page
providing
information for the
home instructor is
included in this
module.



Learning
Technologies
Branch

Alberta
LEARNING

Mathematics 4
Module 3: Fractions and Decimals
Student Module Booklet
Learning Technologies Branch
ISBN 0-7741-1802-4

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	



The Learning Technologies Branch has an Internet site that you may find useful. The address is as follows:

<http://www.learning.gov.ab.ca/lfb>

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

ALL RIGHTS RESERVED

Copyright © 2000, the Crown in Right of Alberta, as represented by the Minister of Learning, Alberta Learning, 11160 Jasper Avenue, Edmonton, Alberta T5K 0L2. All rights reserved. Additional copies may be obtained from the Learning Resources Distributing Centre.

No part of this courseware may be reproduced in any form, including photocopying (unless otherwise indicated), without the written permission of Alberta Learning.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Learning so that appropriate corrective action can be taken.

IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.



Welcome!

Mathematics 4 contains nine modules. Work through the modules in the order given, since several concepts build on each other as you progress through the course.

Mathematics 4

Module 1
Data
Management

Module 2
Number Concepts
and Patterns

Module 3
Fractions
and Decimals

Module 4
Addition
and Subtraction

Module 5
Multiplication

Module 6
Division

Module 7
Measurement

Module 8
Exploring
Geometry

Module 9
Investigating
Outcomes

Icons

The book you are presently reading is called a Student Module Booklet. You will find icons used throughout it. Read the following explanations to find out what each icon tells you to do.



Pay close attention to important words or ideas.



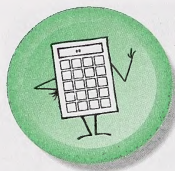
Refer to the textbook *Quest 2000: Exploring Mathematics*.



Use manipulatives, cut-out learning aids, or pull-out pages.



Do an activity to review the concept.



Use a calculator.



Prepare to do a Challenge activity.



Do an activity just for fun!



Do an activity with your home instructor.



Use the Internet.



Use the Answer Key to Self-Marking Activities in the Appendix to correct activities.



Information for the Home Instructor

Manipulatives

For Module 3: Fractions and Decimals, it may be helpful for the student to have a ruler, scissors, and several sheets of paper. These can be used to create fractions of different shapes and sizes. For extra practice, circles and other shapes may be cut out and divided into different numbers of parts

$\left(\frac{1}{2} \text{ s}, \frac{1}{3} \text{ s}, \frac{1}{4} \text{ s}, \text{ and so on}\right)$ and sheets of paper may be folded to form fractions as well

$\left(\frac{1}{2} \text{ s}, \frac{1}{3} \text{ s}, \frac{1}{4} \text{ s}, \frac{1}{8} \text{ s}, \text{ and so on}\right)$.

It may also be useful to have collections of small items (beads, tokens, bread clips, beans, etc.) on hand so that sets may be formed and fractions of those sets described.

In Section 2, a set of Canadian coins should be available to assist the student in counting money amounts and writing them as decimal numbers.

The Cut-Out Learning Aids section of this Appendix includes several pages of base ten blocks and decimal squares. The manipulatives on these pages may be cut out prior to working through the module and stored in envelopes for later use, or they may be cut out as needed throughout the module.

Internet Sites

Suggestions for appropriate Internet sites have been included in the lessons. These sites may change over time, so it would be wise to preview the sites before students use them for extra practice or as a break from their regular work.

Other websites that deal with many mathematics topics (including fractions and decimals) are listed here. These sites may be accessed at any point in the module for review or practice, and to extend the learning of the student.

- <http://tqjunior.advanced.org/4471/>

Play math games and solve problems at this medieval knights website. This interactive site is called Thinkquest and is written by Grade 4 students. The contents of the site change regularly to provide new games and activities.

- <http://explorer.scrtec.org>

Many activities are found at this site. Select the grade level and a fractions topic to find an activity to download onto your computer.



Information for the Student

The Grade 4 Mathematics course is designed to keep you actively involved in learning as you progress through the daily lessons in each of the nine modules. Besides the Student Module Booklets, you will also need a copy of the Grade 4 Mathematics textbook called *Quest 2000: Exploring Mathematics*. The textbook contains pictures, information, questions, and problems that are referred to in the modules. Each module also requires you to complete one or more Assignment Booklets to be sent to your teacher for marking.

Manipulatives

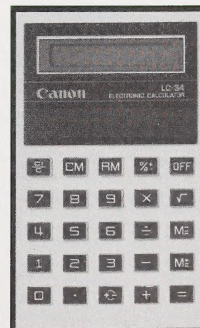
Manipulatives are hands-on materials that you will be using to help you learn new concepts and ideas. They include things like base ten blocks, geoboards, spinners, counters, polygon shapes, tiles, rulers, and metre-sticks. Don't worry if you don't have all of these manipulatives. Some can be found in the Cut-Out Learning Aids section of the Appendix in several of the modules. Some you may be asked to make from materials found in your own home. However, it is highly recommended that you have a set of base ten blocks. They will be used often to help you to understand many new math concepts.



You should use manipulatives whenever you think they will help you understand something new you are learning. Manipulatives can also be useful when you are sharing or discussing what you know with your home instructor.

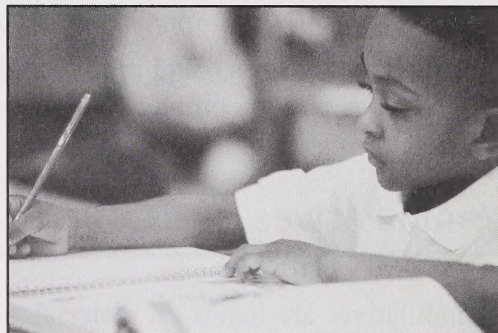
Calculators

You will need a calculator for many of the activities in Mathematics 4. It is important to remember that a calculator is a tool to be used when doing difficult calculations and when investigating what numbers can do. Don't rely on the calculator for calculations that you can do in your head. For example, you would not use a calculator when estimating or doing mental math. Both of these activities rely upon mastering the basic number facts.



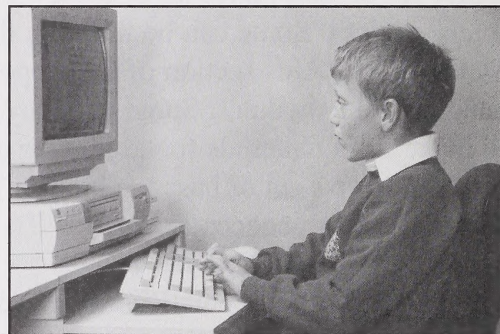
Basic Number Facts

You will practise the basic facts on several days of each module. Each drill is timed to encourage you to work quickly. At first, you may not do very well because you may not know all of the number facts yet, or you may have forgotten some of the number facts you learned last year. Don't worry. By practising the facts regularly, your scores will improve over time. Strategies to help you learn the number facts will be presented in the lessons.



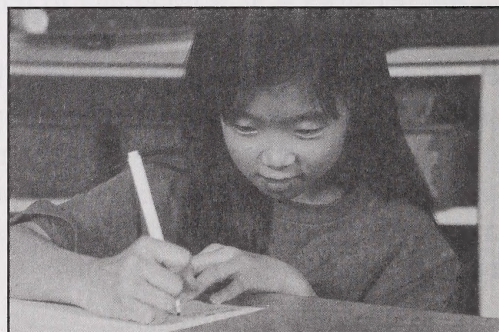
Computers

If you have your own computer at home, you may already know some computer software programs that help you to learn mathematics. There are also many websites on the Internet that provide math activities for students to do. Throughout this course, you will find optional activities that refer to software programs and Internet websites. You should do these activities only when you have finished the daily assigned work. **Note:** Always check with your home instructor before you log onto the Internet. **Remember that any Internet website address given in this module is subject to change.**



Journal Writing

In each Assignment Booklet, you will often be asked to complete a journal entry about something you have been learning in the module. Being able to put into your own words what you have learned is an important skill. It will help you think about what you know as well as help your teacher understand your thinking.

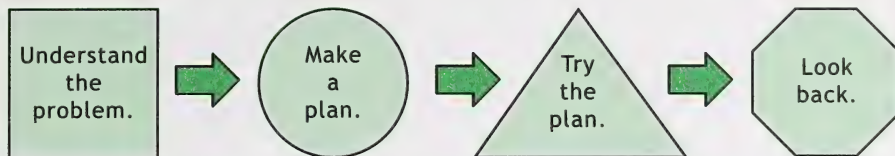




Problem-Solving Skills

You are already familiar with problem solving from earlier grades. This course will continue to help you develop strategies to make you a better problem solver. There are four steps that can be used to solve most problems.

The Four-Step Process



Step 1

Understand
the
problem.

In this step, you need to spend time reading over the problem in order to understand what you are being asked to find. One way to see if you understand the problem is to cover it up and then try restating it in your own words. Sometimes it might seem like not enough information is given. If this happens, try asking yourself the question, “What do I already know that will help me solve this problem?”

Step 2

Make
a
plan.

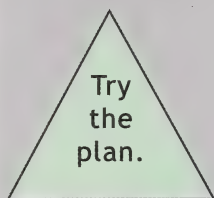
In this step, you decide on the method or strategy you will use to solve the problem. Different problems require different strategies. Most problems can be solved in more than one way. In this course, you will be looking at the following seven strategies:

- acting out the problem
- guessing and checking
- making an organized list
- drawing a diagram
- making a table or chart
- looking for a pattern
- making it simpler

You will be introduced to these strategies as you move through the modules. However, you may review each of the strategies at any time by turning to the Appendix of Module 1.

Remember, there is no one “right” way to solve a problem. The method or strategy you use may be different than the one your home instructor or someone else doing the problem would use. Sometimes you will find that more than one strategy on the list can be used to solve a problem. In fact, sometimes you may decide to invent a strategy of your own that is not even on the list.

Step 3



In this step, you try out one of your strategies to see if it works to solve the problem. Don't worry if you can't find the answer immediately. Some problems take more than one step. You may also find it necessary to use your calculator to do some of the calculations.

Sometimes, as you try to solve the problem, you'll find that your strategy isn't working. Don't give up. Try another method instead.

Step 4



In this step, you take time to look at your answer and ask, "Is my answer reasonable? Does it make sense?" Writing your answer in a complete sentence may help you to see if, in fact, you have answered the question. If not, you may have to check your calculation for errors or, perhaps, try another strategy.

This is also a good time to look at the strategy you used and to think about how you could use it again in other problem-solving situations. Take time to share your strategies with your home instructor, and compare your method with the strategy your home instructor might use.



Remember, problem solving is a skill you need and will use throughout your life. The more practice you have with solving problems, the better your problem-solving skills become. Problems don't always have just one "right" answer. Some problems have several possible answers, just as some problems may be solved in several different ways.

Module Overview	1
-----------------------	---

Section 1: Fractions

Day 1: Fractions	4
Day 2: Understanding Fractions	16
Day 3: Decimals	28
Day 4: Decimals Galore!	42
Day 5: Fractions Meet Decimals	53
Day 6: Fractions and Decimals—A Partnership	60
Day 7: Problem Solving	68
Day 8: Assessing What You Know (I)	79

Send in Assignment Booklet 3A.

Section 2: Decimals

Day 9: New Fractions	84
Day 10: New Decimals	93
Day 11: Working with Tenths and Hundredths	104
Day 12: Fractions and Decimals—Number Neighbours	115
Day 13: Decimal Dollars	125
Day 14: Putting It All Together	137
Day 15: Assessing What You Know (II)	139

Send in Assignment Booklet 3B.

Appendix

Glossary	144
Answer Key to Self-Marking Activities	145
Credits	169
Cut-Out Learning Aids	
Number Facts Progress Chart for Module 3	

Overview

Module 3: Fractions and Decimals

Section 1: Fractions

Section 2: Decimals



Module 3: Fractions and Decimals

You use whole numbers (or counting numbers) many ways in your everyday life. You collect data, count collections of objects, find totals, and use very large numbers.

What happens when you need to count only **parts** of a whole number? For example, you might have eaten one part of a pizza, or you might have painted part of the fence. What do you call these **parts of a whole number**? The numbers that describe these parts are called **fractions** and **decimals**.

In this module you will

- review fractions you already know
- learn how fractions are like decimals
- learn about a new group of fractions and decimals
- learn how fractions and decimals can be used with money amounts



There are **two** Assignment Booklets for Module 3.

You should send in Assignment Booklet 3A after completing Day 8.

You should send in Assignment Booklet 3B after completing Day 15.



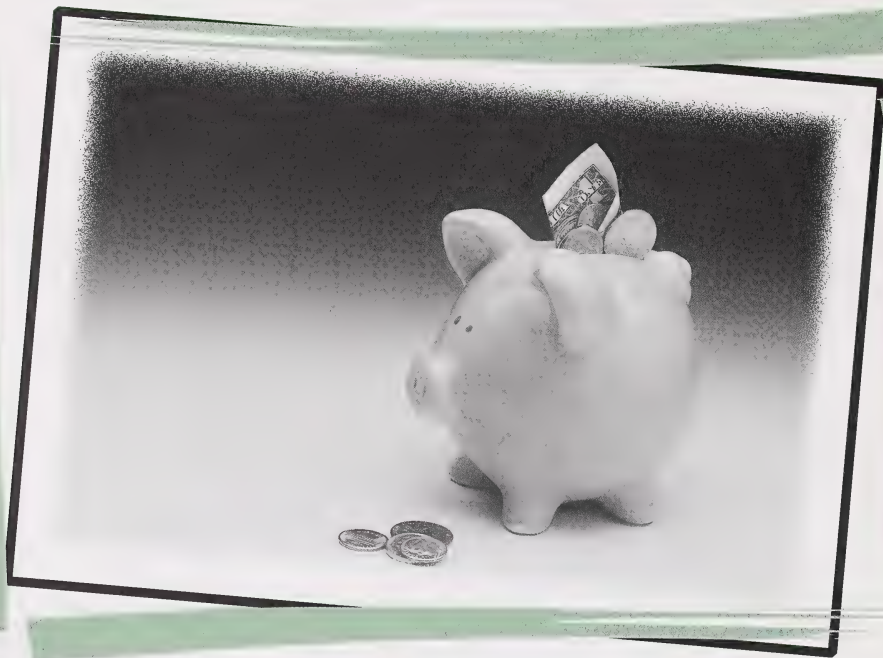
Section 1

Fractions





Fractions



Why Use Fractions?

In your day-to-day life, you use whole numbers (1, 2, 3, 4, 5, and so on) for most of your counting needs. You might count people, boxes, coins, toys, books, cookies, hours, or centimetres as you go through a typical day.

However, there will be times when you wish to count parts of an object. For example, you may need to cut a cake into eight pieces, or you may wish to divide two pizzas equally among five people. You may wish to save one half of your allowance.

How do you count these parts that are less than one whole thing? Whole numbers will not work. You must find another way to refer to these parts of a whole object.

Example

Suppose you and three friends are growing carrots in a shared garden space. You want to divide the carrot crop equally. The four of you have grown three sacks of carrots. How many **sacks** of carrots will each person get?



1. In the space below, try to work out how much the equal shares are. Use words, numbers, pictures, or all of these things to show your ideas.



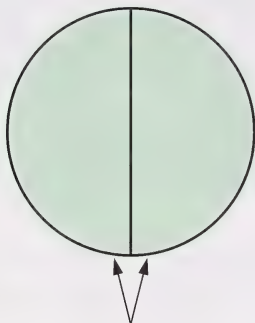
Check your answers in the Appendix.

It's not important if you didn't get the exact answer for the carrot problem. The important thing to realize is that each person gets **less than one** full sack of carrots. You must use numbers to show amounts that are less than 1. Such numbers are called **fractions**.

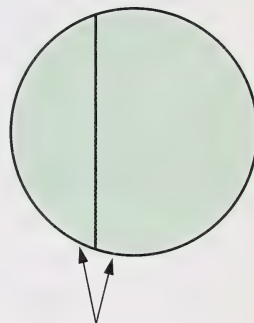
What Do Fractions Look Like?

Fractions are **equal parts** of a whole figure or a whole set. The parts must all be the same size in order to be called fractions.

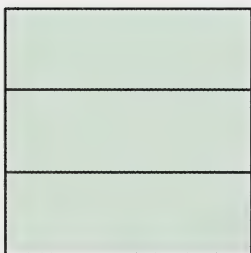
For example, to divide a circle into two equal fractions, each fraction or part must be the same size.



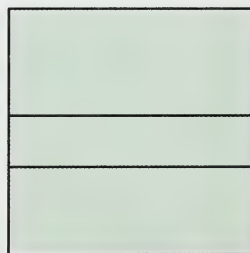
This circle shows two equal parts.
Each part is an equal fraction or part of the circle.



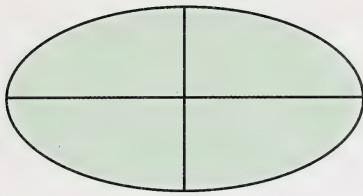
These are not equal parts.
One part is much smaller than the other.



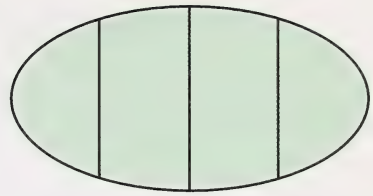
These are equal parts or fractions of the rectangle.



These are not equal parts.



These are equal parts or fractions of the oval.



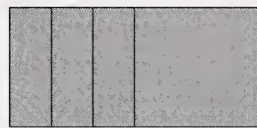
These are not equal parts.

2. Tell which of the following figures are divided into **equal** parts or fractions. Answer **Yes** or **No**.

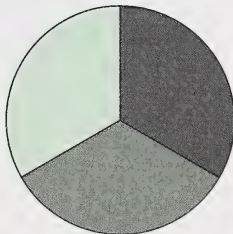
a.



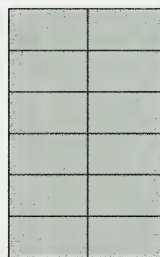
b.



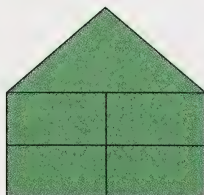
c.



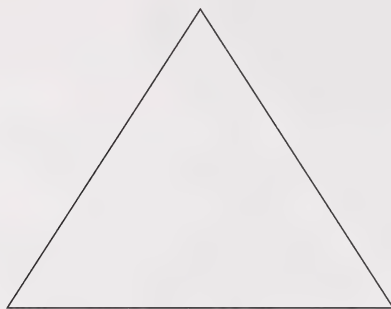
d.



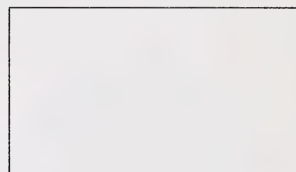
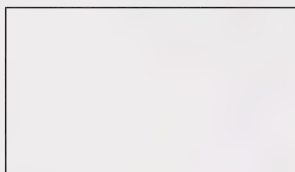
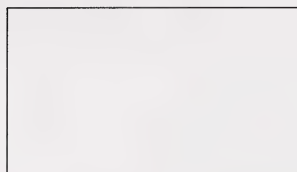
e.



3. a. Divide this triangle into two equal parts.



- b. Show **three** different ways of dividing a rectangle into four equal parts.



4. Draw a rectangle that is divided into ten equal parts.

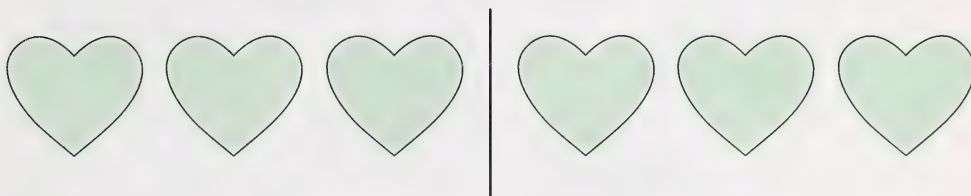


Check your answers in the Appendix.

Fractions of Sets of Objects

Sets of objects can be divided into equal fractions. Each part of the set must have the same number of objects.

This set of hearts is split into two equal parts or fractions.



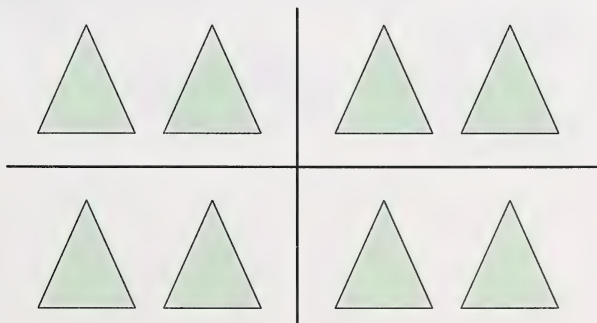
Each part has the same number of hearts in it.

This set of hearts is **not** divided into two equal fractions. The parts are different sizes.

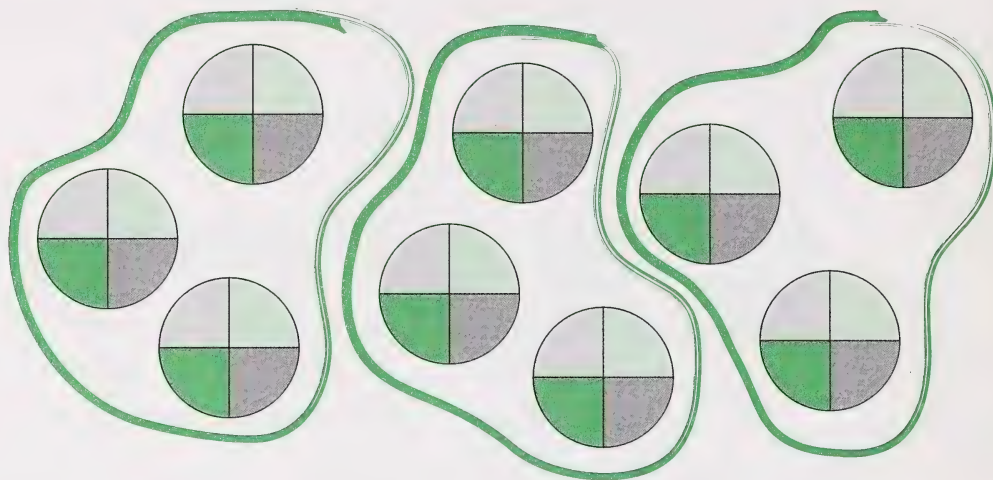


One part has two hearts and the other part has four hearts.
The parts are not equal in size.

This set is split into four equal parts or fractions. Each part of the set contains two triangles.

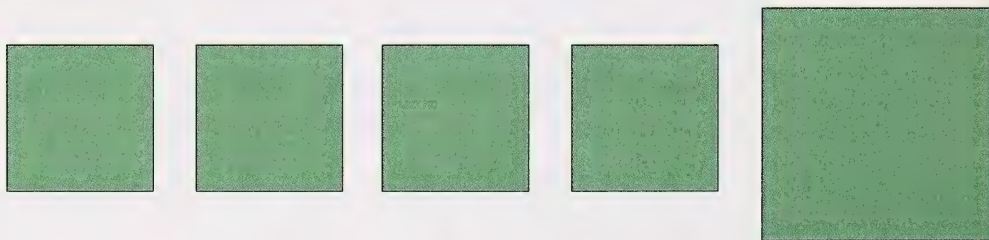


This set shows three equal parts or fractions. Each part of the set contains three circles.

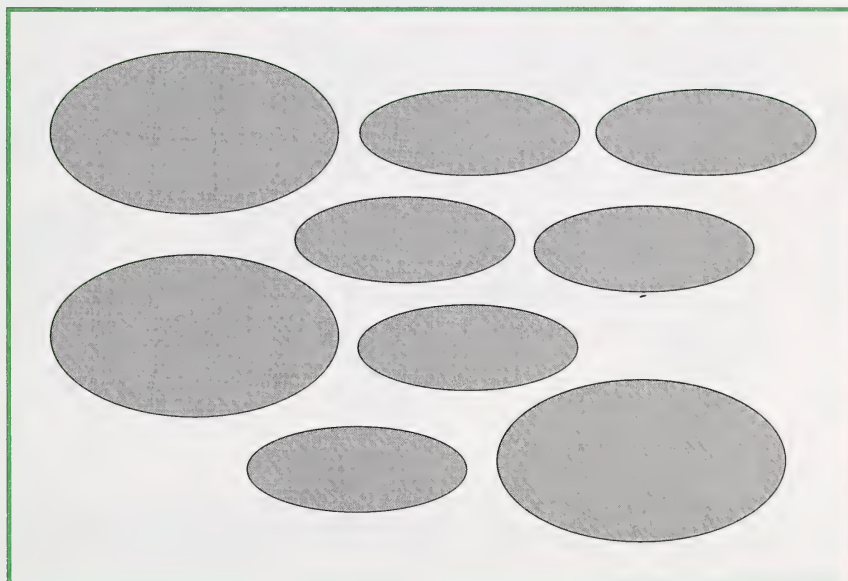
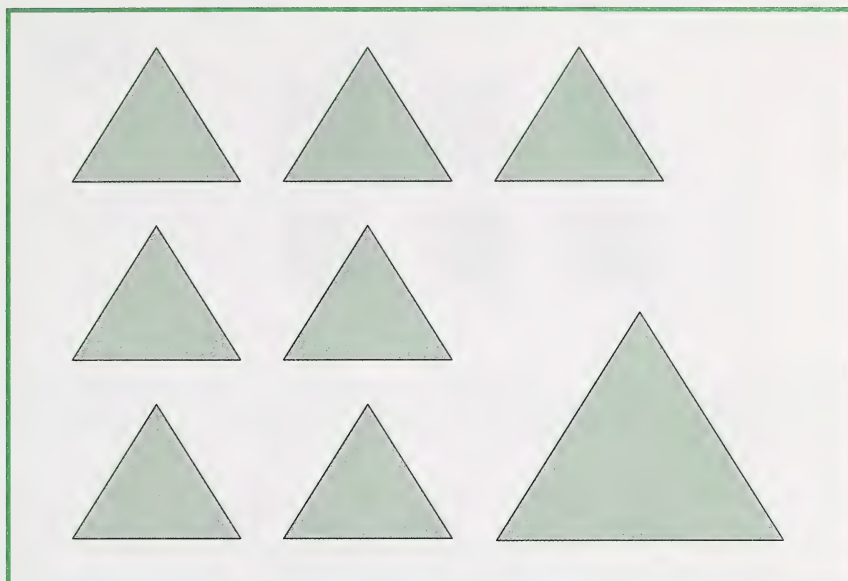


Each part or fraction of the set must be the same.

Look at this set. One part of the set of squares is much larger than the other parts. This set does not show five equal parts or fractions.

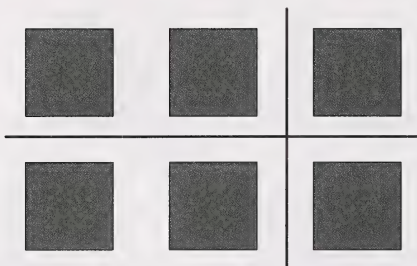


Here are two other examples showing unequal parts of a set.

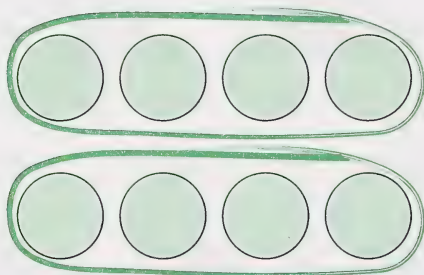


5. Tell which of the following sets are divided into **equal** parts or fractions. Answer **Yes** or **No**.

a.



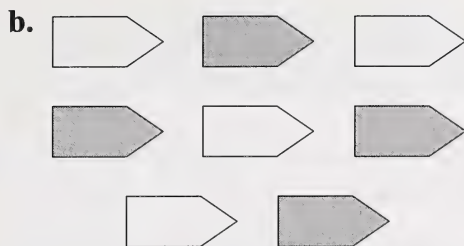
b.



6. In each of the following sets, tell whether the number of shaded parts equals the number of unshaded parts. Answer **Yes** or **No**.

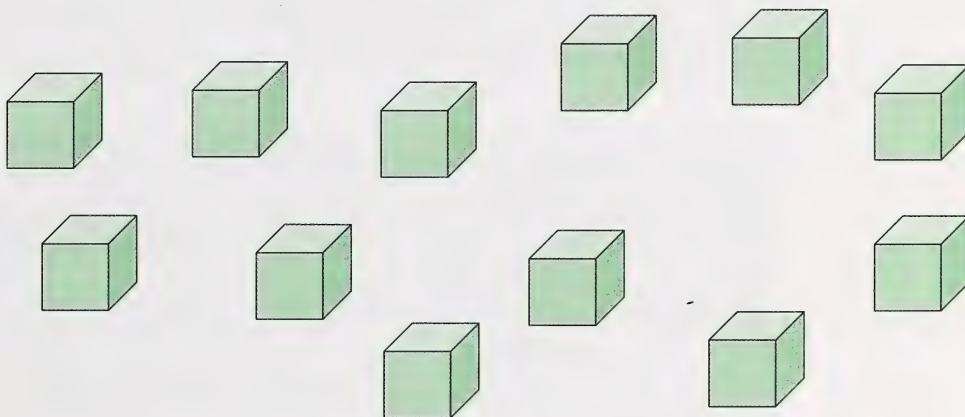
a.





Check your answers in the Appendix.

7. Divide this set into four equal parts or fractions. Draw circles around the objects to show the equal parts.



Check your answer in the Appendix.

Basic Number Facts Practice



Before you do your Assignment Booklet activities for Day 1, it is time to review your addition number facts.




Turn to the Number Facts Progress Chart for Module 3 in the Appendix. Remove the chart from the Appendix and hang it in your study area. You will use this chart to record your scores for the number facts drills in Module 3.

Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Addition Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

8. Addition Number Facts
Timed Exercise: 2 minutes

$$\begin{array}{r} 3 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 4 \\ \hline \end{array}$$

$8 + 1 =$

$4 + 2 =$

$0 + 9 =$

$3 + 3 =$

$6 + 8 =$

$$\begin{array}{r} 4 \\ + 0 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 9 \\ \hline \end{array}$$

$5 + 7 =$

$9 + 9 =$

$8 + 4 =$

$6 + 5 =$

$1 + 3 =$

$$\begin{array}{r} 7 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 6 \\ \hline \end{array}$$

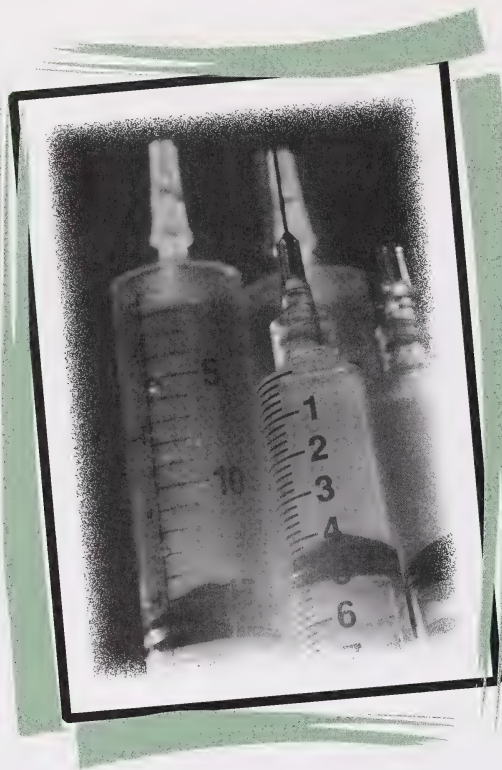


Check your answers in the Appendix.

Turn to Assignment Booklet 3A, and complete the activities for Day 1.



Understanding Fractions



In Day 1 you learned the purpose of fractions. You also learned that whole objects or whole sets must be split into equal parts in order to make fractions.

In Day 2 you will learn to read and write fractions. Knowing how to read and write fractions is very important in many jobs. Doctors and nurses must know fractions so that they can give the right amount of medicine to people who are sick. Cooks and bakers use fractions in their recipes. If they use the wrong fractions, the food might not taste good or might even make you ill.

How Fractions Get Their Names

Fractions are named by the number of parts the whole object or set is divided into.

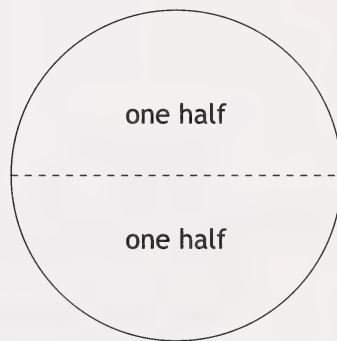
Find the circles and rectangles in Day 2 of the Cut-Out Learning Aids section of the Appendix. Carefully cut them out.

Practise making the equal fractions shown in the following examples by folding your cutouts. You should label each fraction as shown in the examples.

Example

Fold a whole circle into two equal parts.
Each part is called **one half**.

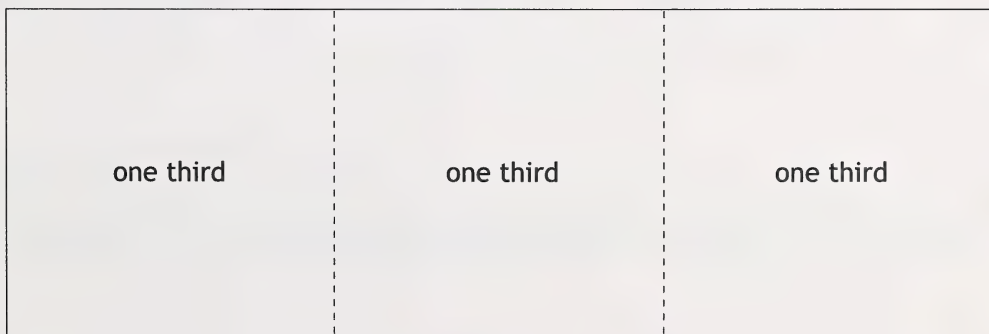
One whole contains two halves.



Example

Fold a whole rectangle into three equal parts.
Each part is called **one third**.

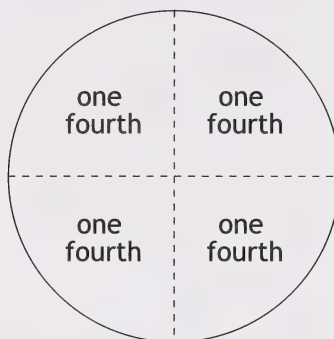
One whole contains three thirds.



Example

Fold a whole circle into four equal parts. Each part is called **one fourth** or **one quarter**.

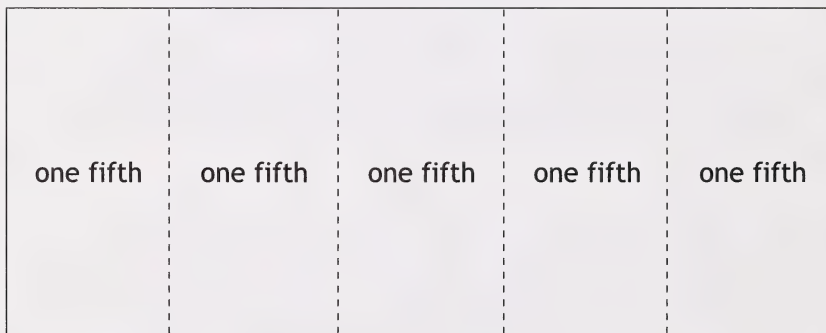
One whole contains four fourths.




Example

Fold a whole rectangle into five parts. Each part is called **one fifth**.

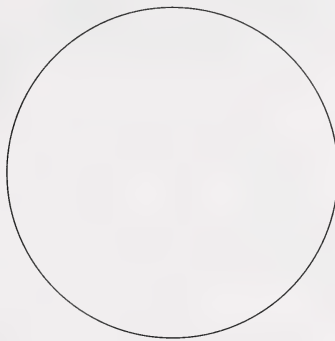
One whole contains five fifths.





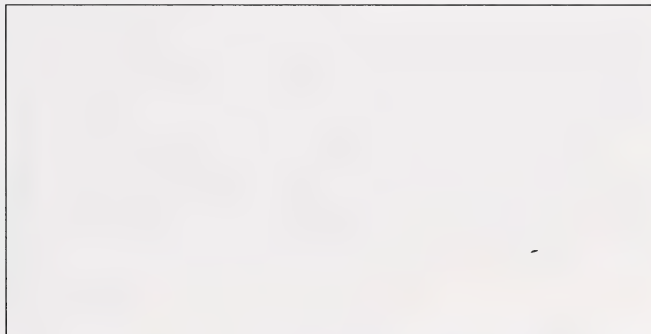
Try the following questions on your own. Use your cutouts to help you find the answers.

1. a. Use a ruler to draw lines to divide this circle into six equal parts.



- b. Each fraction is called one _____.

2. a. Use a ruler to draw lines to divide this rectangle into ten equal parts.



- b. Each fraction is called one _____.

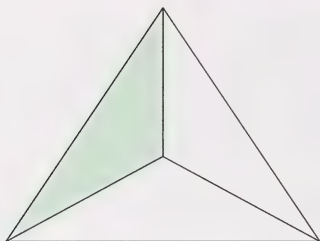


Check your answers in the Appendix.

How Do You Read and Write Fractions?

Fractions show

Parts of a Whole



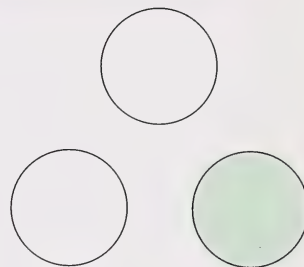
The triangle is divided into three equal parts.

One of the three parts is shaded.

The fraction is written as $\frac{1}{3}$.

or

Parts of a Set



The set has three equal parts.

One of the three circles is shaded.

The fraction is written as $\frac{1}{3}$.

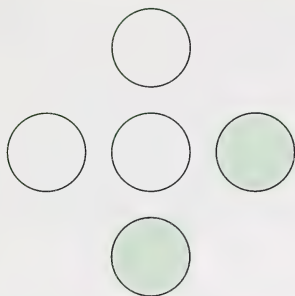
In each picture, **one part out of three parts** is shaded. If you want to show this fraction in numbers, you must show both the number of parts shaded and the total number of parts.

Number of parts shaded = 1

Total number of parts = 3

Using numbers, the fraction is written as $\frac{1}{3}$. This is read as “**one third**,” which means **one out of three**.

Here are some more examples of different ways of showing fractions.



This fraction shows that **two parts out of five** are shaded.

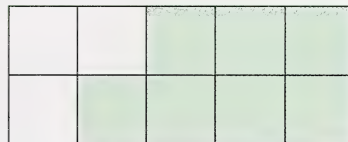
This is written as $\frac{2}{5}$.

This fraction is read as “**two fifths.**”

This fraction shows that **seven parts out of ten** are shaded.

It is written as $\frac{7}{10}$.

It is read as “**seven tenths.**”



This fraction shows that **one part out of two** are shaded.

This fraction is $\frac{1}{2}$.

It is read as “**one half.**”



This fraction shows that **two parts out of two** are shaded.

This fraction is $\frac{2}{2}$.

It is read as “**two halves.**”



Naming the Parts

The parts of a fraction have special names. The upper number is called the **numerator**. The bottom number is called the **denominator**.



$\frac{1}{4}$ ← Numerator (number of parts out of the total)
 ← Denominator (total number of parts)

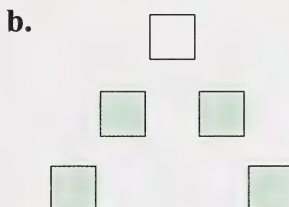
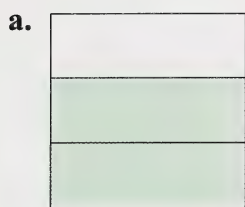
3. Explain in words the meaning of the fraction $\frac{1}{3}$.



Check your answers in the Appendix.

4. Write these fractions. Remember to make the numerator a smaller number than the denominator.
- a. a fraction with a numerator of 2 _____
 - b. a fraction with a denominator of 10 _____
 - c. a fraction in which the denominator is twice as large as the numerator

5. Write the fraction that tells how much of each set or figure is shaded.
Use numbers to write your fractions.



Check your answers in the Appendix.

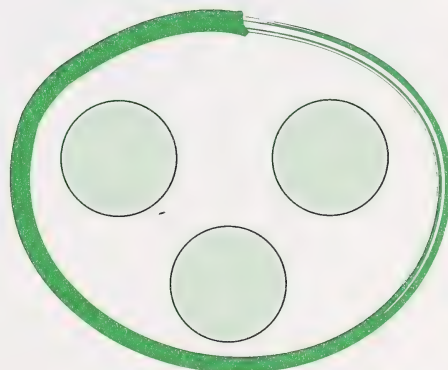
When the Numerator and the Denominator Are the Same

Sometimes the numerator and denominator are exactly the same number.

Numerator \longrightarrow $\frac{3}{3}$
Denominator \longrightarrow $\frac{3}{3}$

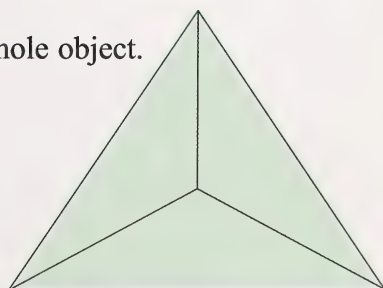
This fraction is read as “three thirds.”

All three equal parts are shaded.



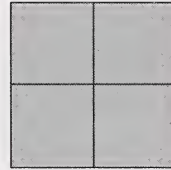
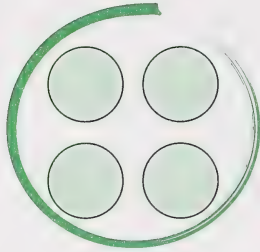
Three thirds can mean one whole set or one whole object.

Three thirds is the same as 1.

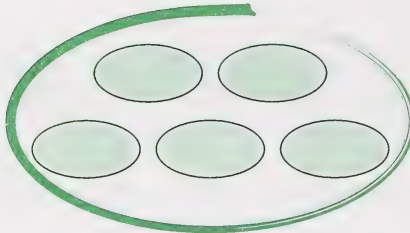


When the numerator and the denominator are the same, it really means **one whole thing** or **one whole set**.

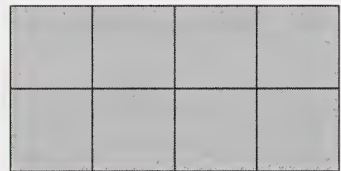
$$\frac{4}{4} = 1 \text{ (whole)}$$



$$\frac{5}{5} = 1 \text{ (whole)}$$



$$\frac{8}{8} = 1 \text{ (whole)}$$



6. Draw a shaded set or figure that shows each fraction.

a. $\frac{1}{2}$

b. $\frac{3}{4}$

c. $\frac{5}{10}$

d. $\frac{3}{3}$

Check your answers in the Appendix.

7. Turn to page 140 in your textbook and complete questions 2, 3, and 5 of On Your Own. Tell what fraction of the flag each colour is. Question 1 is done for you.

On Your Own, Question 1

- Yellow: $\frac{2}{4}$ • Blue: $\frac{1}{4}$ • Red: $\frac{1}{4}$

On Your Own, Question 2

- Red: _____ • Green: _____
• White: _____ • Black: _____

On Your Own, Question 3

- Red: _____ • White: _____

On Your Own, Question 5

- Green: _____ • Yellow: _____ • Red: _____



8. Turn to page 135 in your textbook and complete the last part of question 1 of Starting Out.

Starting Out, Question 1

Recipe for: _____

Ingredients:

Method:

Check your answers in the Appendix.





Notes to the Home Instructor

For extra practice and review of basic fractions, the student may want to visit the following websites:

- <http://www.col-ed.org/cur/math/math19.txt>

An activity asks students to divide words into fractional parts to create new words. This is a fun decoding activity.

You may need to guide the student through the steps in this activity.

- <http://math.rice.edu/~lanius>

This is an interactive site dealing with many math concepts and it is suitable for various grade levels.

If the student needs reinforcement or review of basic fractions, choose “Who Wants Pizza?” to reteach and review. The activity “Pattern Blocks/Fraction Shapes” uses geometric shapes to teach about fractional parts.



Turn to Assignment Booklet 3A, and complete the activities for Day 2.





Decimals



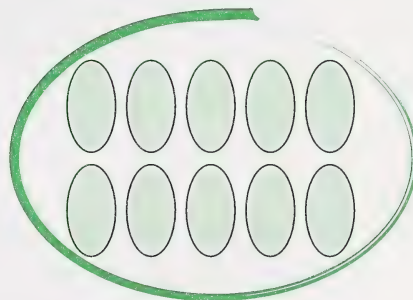
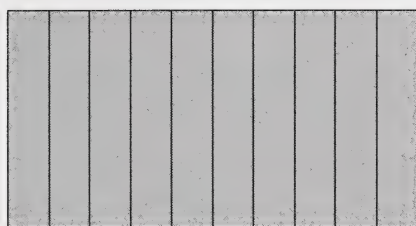
In Days 1 and 2 you studied fractions, the numbers that stand for amounts less than 1. Today you will learn another way to express numbers less than 1. You will learn to express numbers using **decimals**.

You are already familiar with decimal numbers, but you may not realize it. For example, money is counted with decimal numbers, as are many measurements.

Thinking About Tenths

When you learn about **decimals** in this lesson, you will really be thinking about fractions called **tenths**.

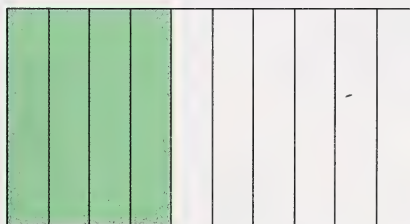
Remember that sets or objects divided into ten equal parts are actually divided into **tenths**.



These pictures show tenths. Each part is called one tenth.



Decimal numbers are an easy way to write numbers that show tenths of a set or tenths of an object.

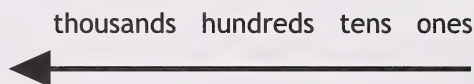


This fraction can be written
as $\frac{4}{10}$ or 0.4.

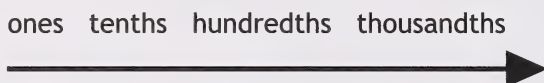
Decimal numbers are really another way of writing fractions. They are used to show **parts** of a number less than 1. Decimals show these smaller parts in **tenths** or **hundredths**.

Now think about numbers that are **less than one**. Numbers that are less than one may be shown as fractions or **decimals**.

For whole numbers, the place values increase as you move left from the ones place.



If you move right from the ones place, the place values get smaller.



The first place-value column to the right of the ones is the **tenths**. A **one** is ten times bigger than a **tenth**.

Thousands	Hundreds	Tens	Ones	Tenths

The decimal point separates the whole number from the part that is less than 1.



For example, look at the number 57.8.

The whole
number part The decimal
part

↓ ↓

57.8

Hundreds	Tens	Ones	Tenths
	5	7	8

Read 57.8 as “fifty-seven and eight tenths.”

To see some examples of decimals, read pages 136 and 137 in your textbook. Then answer the following questions.

1. List **three** examples of decimal numbers from pages 136 and 137.

- _____
- _____
- _____



2. Where else have you seen decimal numbers?

3. How do decimal numbers look different from whole numbers or fractions?



Check your answers in the Appendix.

Place Value

To see how decimal numbers fit into the number system, first review how place value works with whole numbers.

Look at the number **3649** on this place-value chart.

Thousands	Hundreds	Tens	Ones
3	6	4	9

- The value of the 3 is 3000.
- The value of the 6 is 600.
- The value of the 4 is 40.
- The value of the 9 is 9.



Each digit or place has a **larger** value as you move further to the **left**. Each place is actually ten times larger than the place to its right.

$\xleftarrow{\times 10} \quad \xleftarrow{\times 10} \quad \xleftarrow{\times 10}$			
Thousands	Hundreds	Tens	Ones

Building Decimals

Now that you know what decimal numbers look like, it's time to make and read a few of them!

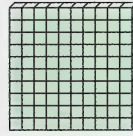
First, think about your work with **base ten blocks** in Module 2. Whole number place values were shown with the following base ten blocks.



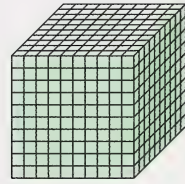
Unit cube (1)



Tens rod (10)



Hundreds flat (100)

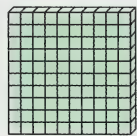


Thousands block (1000)

Today you will learn how to show decimal numbers with base ten blocks.

Find the base ten blocks in Day 3 of the Cut-Out Learning Aids section of the Appendix. Cut them out and use them to work through the next few pages.

Since numbers after the decimal point are less than 1, you can't use the unit cube for the number 1. You need to use a larger base ten piece so that you can divide it into smaller decimal number parts.

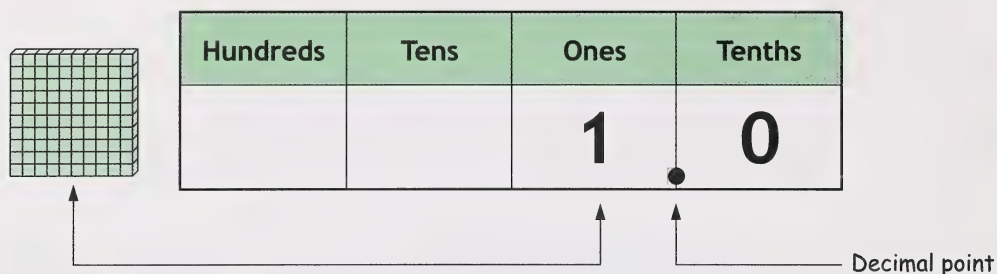


Let the flat stand for 1.

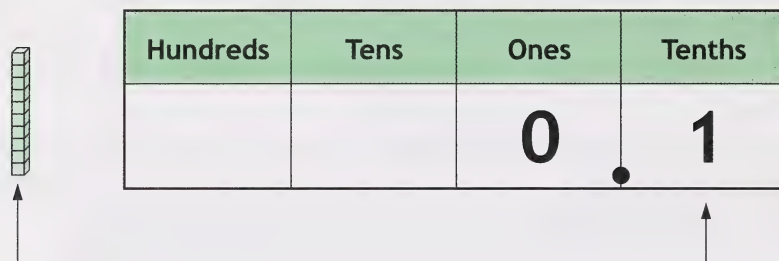
4. What part of the flat would stand for $\frac{1}{10}$ (one tenth)? Explain your answer.

Check your answer in the Appendix.

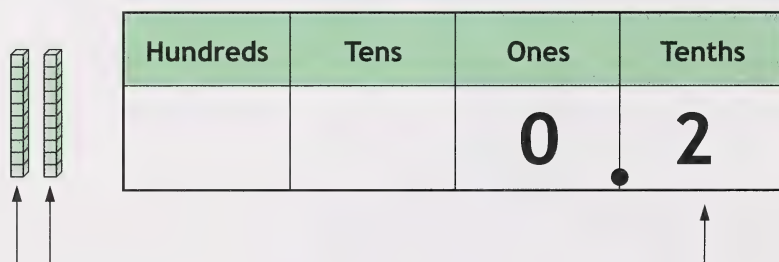
The flat stands for 1. This number can be written as 1 or 1.0. The zero shows that there are no tenths.



The rod stands for $\frac{1}{10}$. One tenth is written as **0.1** and read as “**one tenth.**” The zero shows that there is no whole number part.

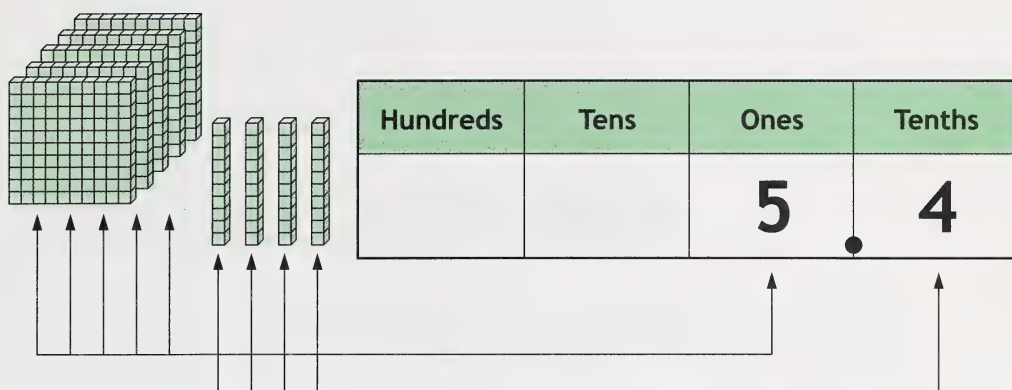


What happens when there is more than one rod?



Two rods stand for two tenths. Two tenths is written as **0.2** and read as “**two tenths.**”

What about flats and rods together?



Five flats and four rods stand for 5 ones and 4 tenths. This number is written as **5.4** and read as **“five and four tenths.”**

Suppose you were given a decimal number. Could you show it using your base ten blocks?

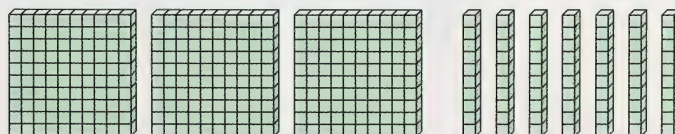
Example 1

How would you show **3.7** using base ten blocks?

The number 3.7 is read as **“three and seven tenths.”** It looks like this on the place-value chart.

Hundreds	Tens	Ones	Tenths
		3	7

Three ones and 7 tenths means that there are three flats and seven rods.



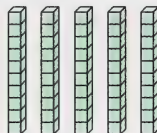
Example 2

Show the number **0.5** in base ten blocks.

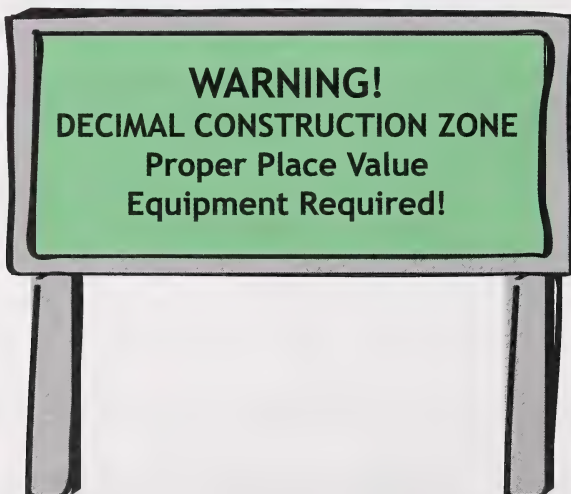
The number 0.5 (five tenths) means zero ones and 5 tenths.

Hundreds	Tens	Ones	Tenths
		0	5

This number is shown using zero flats and five rods.

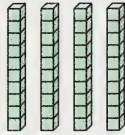
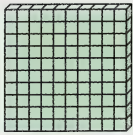


Practise building and reading decimal numbers in the following questions.
Use your base ten blocks to help you.



5. Look at the following base ten numbers and show their place values on the charts.

a.



Hundreds	Tens	Ones	Tenths

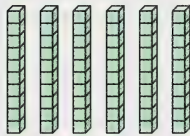
b.



Hundreds	Tens	Ones	Tenths

6. Look at the following base ten numbers and write them in words. Then write them as numbers with decimal points.

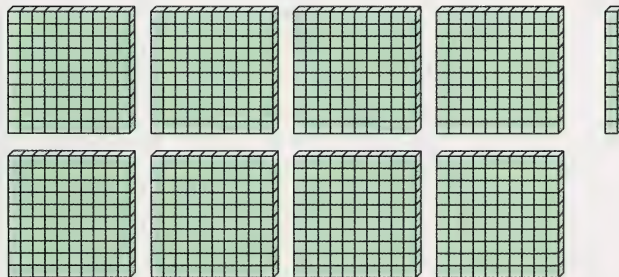
a.



Words: _____

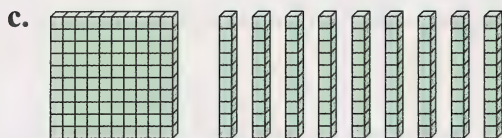
Numbers: _____

b.



Words: _____

Numbers: _____



Words: _____

Numbers: _____

Check your answers in the Appendix.

For question 7, use your base ten blocks that you cut out earlier.

7. Use base ten blocks to show each of the following decimal numbers.
Paste the correct number of flat and rod cutouts in the answer space for each question.

a. 2.8

b. 0.4

c. 5.0



Check your answers in the Appendix.

8. Three members of the Base Ten Figure Skating Judges' Association held up the following scores for competitor Axel Twirlinova. Change the scores into regular decimal numbers so Axel can read them.



a. _____

b. _____

c. _____



Check your answers in the Appendix.


Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Subtraction Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

9. Subtraction Number Facts
Timed Exercise: 2 minutes

$$\begin{array}{r} 7 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ - 5 \\ \hline \end{array}$$

$16 - 9 =$

$11 - 8 =$

$6 - 0 =$

$4 - 2 =$

$9 - 3 =$

$$\begin{array}{r} 12 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 6 \\ \hline \end{array}$$

$18 - 9 =$

$13 - 7 =$

$9 - 1 =$

$16 - 8 =$

$5 - 3 =$

$$\begin{array}{r} 1 \\ - 0 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ - 3 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 3A, and complete the activities for Day 3.





Decimals Galore!



In Day 3 you modelled decimal numbers with base ten blocks. Today you will show decimal numbers with lined squares and number lines.

Drawing Decimals

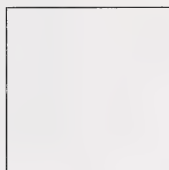
Decimal numbers can be shown by using lined squares.



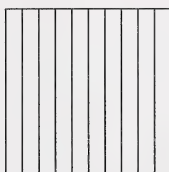
Lined squares are not three-dimensional like base ten blocks that you can turn over in your hands. They are flat and are drawn on paper.

How do you show decimal place values with lined squares?

Ones can be shown with an “empty” square. The square shows that ones are whole, not divided into parts.



Tenths are shown by dividing the whole square into ten equal parts.

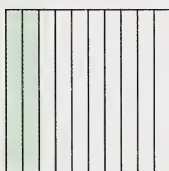


The parts of the square can be **shaded** to show decimal numbers.

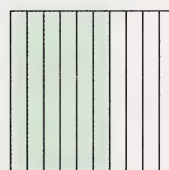
Examples



= 1.0 (The whole square is shaded.) Read as “one.”



= 0.2 (Two out of ten parts are shaded.) Read as “two tenths.”



= 3.6 (Three whole squares plus six parts out of ten are shaded.) Read as “three and six tenths.”

1. Explain why this square stands for the number **1.0**.



2. Write the decimal numbers shown by the following lined squares. Also write each number in words.

a.



Number: _____

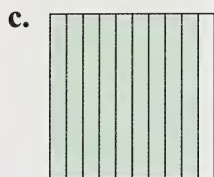
Words: _____

b.



Number: _____

Words: _____



Number: _____

Words: _____

d.



Number: _____

Words: _____

Check your answers in the Appendix.

Turn to Day 4 in the Cut-Out Learning Aids section of the Appendix.
Remove the page with the lined squares on it and cut them out.

3. Cut out and shade your lined squares to stand for the following numbers.
Paste the squares into the answer spaces.

a. 0.7

b. 1.3

c. 3.8

d. 2.0



Check your answers in the Appendix.

Greater Than or Less Than?

Suppose that your fence needs painting. You decide to paint 0.3 of the fence one day. The next day, you paint another 0.5 of the fence. On which day did you paint more of the fence, the first day or the second day?



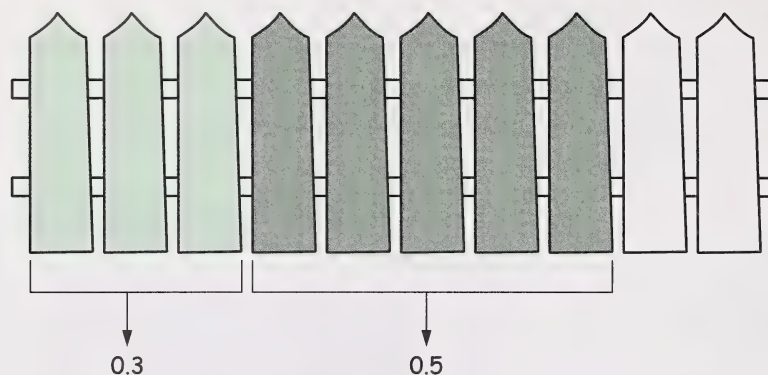
To answer this question, you need to know which decimal number is greater.

Think

0.3 is the same as **three tenths** of the fence.

0.5 is the same as **five tenths** of the fence.

Five tenths is a larger portion than three tenths.



Therefore, 0.5 of the fence is greater than 0.3 of the fence.

Solution: You painted more of the fence on the **second** day.

It is important to be able to compare decimal numbers to see which number is largest or smallest. Decimal numbers and whole numbers are very similar in the way they are compared.

For example, when comparing whole numbers, you know that 2 is greater than 1. When comparing decimal numbers, you know that 0.2 is greater than 0.1.

Think about larger and smaller decimals (and fractions) to complete the following questions.

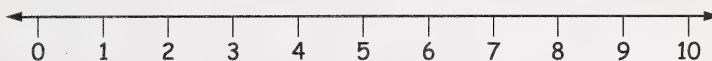
4. a. Use a decimal number to tell how much of the fence still needs to be painted. _____
- b. Which is greater, 0.8 or 0.7? _____
- c. Which is smaller, 1.0 or 1.3? _____

Check your answers in the Appendix.



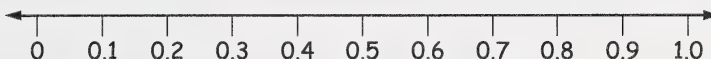
Decimals All in a Row

Number lines are used to show the order of numbers. You have probably seen number lines such as the following with whole numbers.



Number lines can also show decimal numbers. The following number line shows all the **tenths** places between 0 and 1. The numbers get larger as you move to the right.

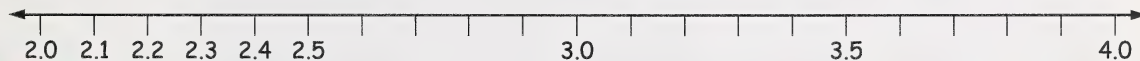
5. Read the places from 0 to 1 aloud. Get your home instructor to listen to you as you say each number.



Check your answers in the Appendix.

Number lines can show many different sets of numbers. The following number line shows decimal numbers from 2.0 to 4.0. Not all the tenths places are labelled.

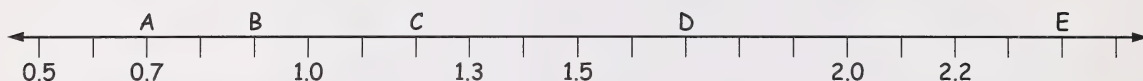
6. Complete this number line by filling in the missing numbers. Then read all the decimal numbers between 2.0 and 4 aloud. Get your home instructor to listen to you as you say each number.



Check your answers in the Appendix.

Now, practise reading and writing tenths in the following questions.

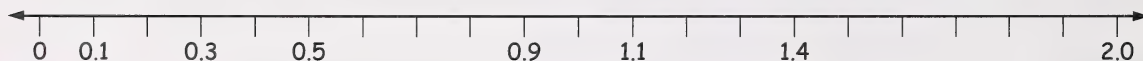
7. Study the following number line. Notice that some numbers are missing. Answer the questions as if all the decimal numbers were shown on the line.



- What is the smallest number on the line? _____
- What is the largest number on the line? _____
- Fill in the chart with the numbers that match the letters above the line. An example is done for you.

Letter	Decimal Number	Number in Words
A	0.7	seven tenths
B		
C		
D		
E		

8. Fill in the missing decimal numbers on this number line.



Check your answers in the Appendix.

9. Use the following decimal numbers to label the number line. Start with the **smallest** decimal numbers on the **left** end of the number line.

1.2, 0.8, 1.5, 1.0, 1.3, 0.9, 1.7, 1.4, 1.6, 1.1




Check your answers in the Appendix.

Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice	
	Multiplication Number Facts
	Number Completed in 2 Minutes _____
	Number Correct in 2 Minutes _____
	Record your score on the Number Facts Progress Chart

10. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$0 \times 6 =$

$5 \times 3 =$

$7 \times 2 =$

$7 \times 6 =$

$3 \times 4 =$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$$

$4 \times 4 =$

$3 \times 7 =$

$5 \times 0 =$

$6 \times 6 =$

$7 \times 4 =$

$$\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

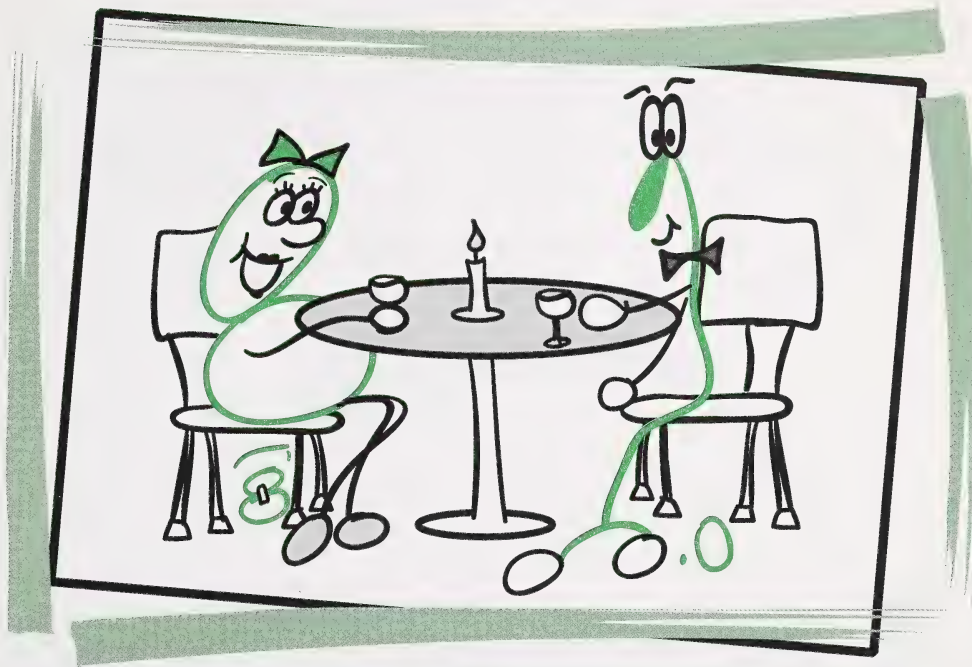
$$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$

Check your answers in the Appendix.

Turn to Assignment Booklet 3A, and complete the activities for Day 4.



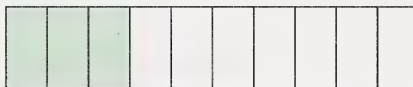
Fractions Meet Decimals



In Days 1 to 4 you learned to read and write fractions and decimals. Today you will see how fractions and decimals are related.

Renaming Fractions

1. a. Name the fraction shown by the figure. _____



- b. Think of other ways to show the fraction. Draw those ways below.



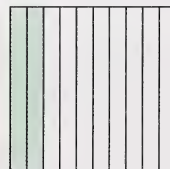
Check your answers in the Appendix.

It's All the Same

There are many ways to show and name fractions. The really interesting thing is that all these names can be used for decimals as well!

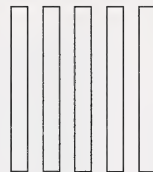
If you were asked to read and name the following square, there are several ways you could answer:

- You could say “**two tenths.**”
- You could write $\frac{2}{10}$.
- You could write **0.2**.

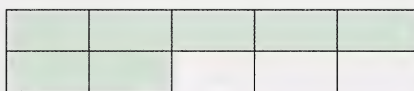


If you were asked to name the following set of base ten blocks, there are several ways you could answer:

- You could say “**five tenths.**”
- You could write $\frac{5}{10}$.
- You could write **0.5**.



2. Look at the following diagram and decide what number it shows. Write your answer in words, as a fraction, and as a decimal number.



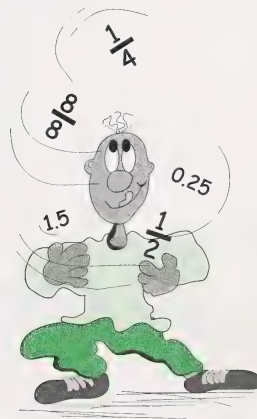
Words: _____

Fraction: _____

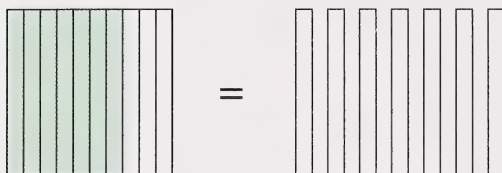
Decimal number: _____

Fractions and decimal numbers are very closely related. They are both ways of naming the same number, and they are read in the same way.

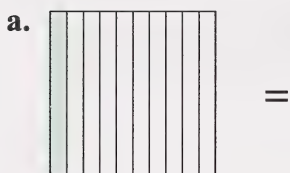
Practise juggling fractions and decimals in the following questions. Use your base ten blocks and lined squares to help you.



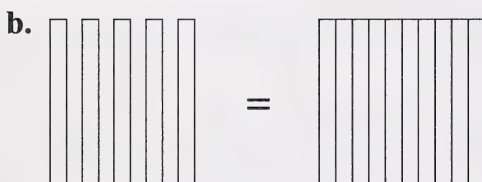
3. Change each base ten drawing to a lined square drawing, or each lined square drawing to a base ten drawing. For each question, also write the words for each number. An example has been done for you.



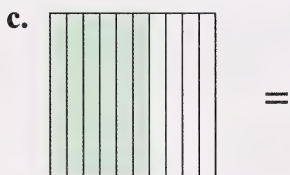
Words: seven tenths



Words: _____



Words: _____



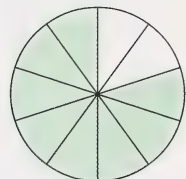
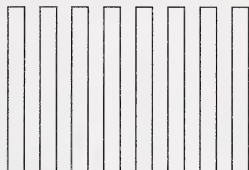
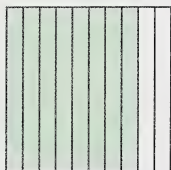
Words: _____

Check your answers in the Appendix.

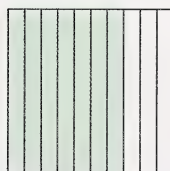
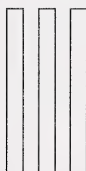


4. Circle the picture in each group that does not match the number value of the others.

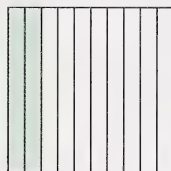
a.



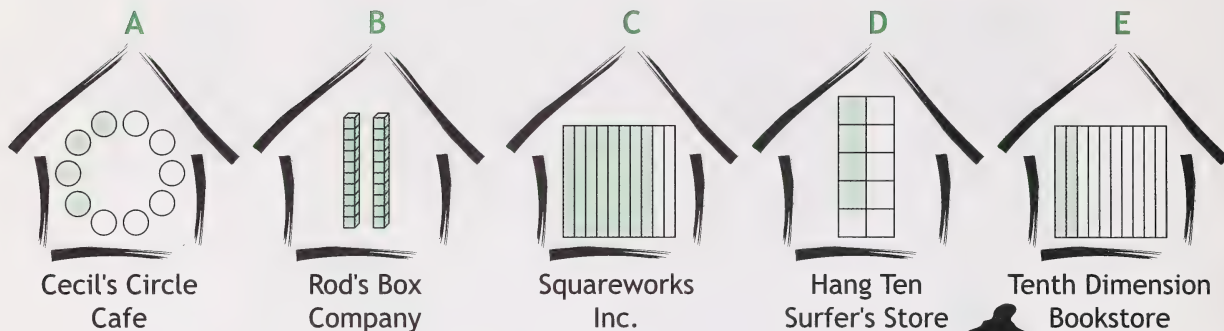
b.



5. Think of **three** other ways to show the following fraction or decimal without using any numbers. Draw your answers in the space below.



6. Police are investigating a strange group of number thieves known as the Base Ten Bad Boys. They steal only number pictures, and each member of the gang steals the same number value every time. The following numbers were stolen from five different places:



- a. Write the decimal number value of each stolen picture.

A: _____ B: _____

C: _____ D: _____

E: _____



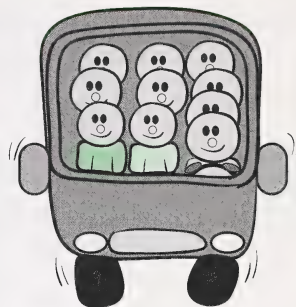
- b. How many thieves took part in these five robberies? Explain your thinking.

Check your answers in the Appendix.



Word Problems with Fractions and Decimals

Mr. Adams has a big van that can hold 10 people.
On a recent trip to the mountains, there were 5 men,
3 women, and 2 children in the van.



Describe the number of people in the van in **fractions** and **decimal numbers**. To answer this problem, first think about the total number of seats in the van.

Children

Children use **two out of ten** seats, or $\frac{2}{10}$ of the seats. To write $\frac{2}{10}$ as a decimal, you need to write **0.2** to tell the portion of the seats that are used by children.

Men

Men use **five out of ten** seats, or $\frac{5}{10}$ of the seats. To write $\frac{5}{10}$ as a decimal, you need to write **0.5** to tell the portion of the seats that are used by men.

Use the examples for children and men to help you answer the following question.

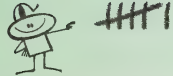
7. Describe the number of **women** in the van as a **fraction** and as a **decimal number**.

Fraction: _____ Decimal number: _____

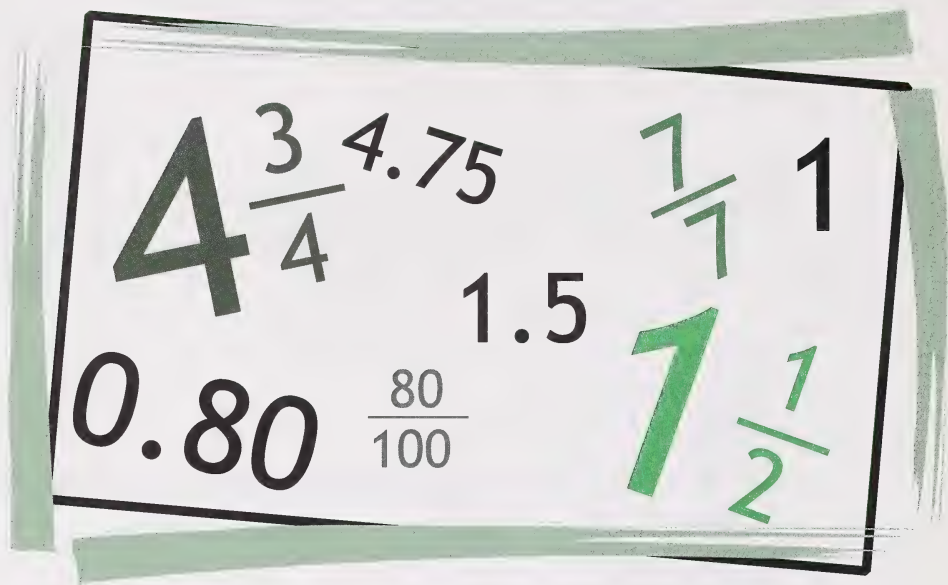
Check your answers in the Appendix.

Turn to Assignment Booklet 3A, and complete the activities for Day 5.





Fractions and Decimals—A Partnership

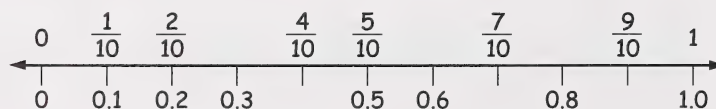


In Day 5 you connected fractions and decimal numbers by using manipulatives and pictures. Today you will connect fractions and decimals in another way.

Number Partners

Look at the following **number line**. Fractions are written in a row along the top of the line. Decimals are written along the bottom of the line.

1. Fill in the missing numbers.



Check your answers in the Appendix.



Grab Your Partner!

Question 1 showed that fractions and decimal numbers are related. On the number line, each fraction has a matching decimal number with the same value.

Tenths can be written as either fractions or decimals.

Example

- The fraction $\frac{8}{10}$ can be written as the decimal number 0.8.
- The decimal number 0.5 can be changed to the fraction $\frac{5}{10}$.



The digit that is in the tenths place in a decimal number is the numerator in the matching fraction.

$$0.1 = \frac{1}{10}$$

$$\frac{6}{10} = 0.6$$

This number picture

 can be named by the fraction $\frac{4}{10}$ or the decimal number **0.4**. In words, this number is **four tenths**.

Practise changing fractions and decimal numbers back and forth by completing the following questions.

2. Change the following fractions into decimal numbers. Use numbers only.

a. $\frac{2}{10} =$ _____

b. nine tenths = _____

c. $\frac{5}{10} =$ _____

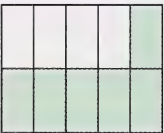


3. Write the following decimal numbers as fractions. Use numbers only.

a. 0.7 = _____

b. three tenths = _____

c. 0.4 = _____

4. Fill in the following chart with the fractions, decimal numbers, and words that name each number picture.

Picture	Fraction	Decimal Number	Number in Words
			
			
			

5. Frankie mowed $\frac{3}{10}$ of the lawn. His friend Jamal mowed 0.4 of the lawn. Did they mow equal parts of the lawn? Explain your answer. Use pictures if you wish.



Check your answers in the Appendix.

Finding Fractions with a Calculator



There is another way to change fractions to decimal numbers. The line in the middle of a fraction can also mean “divided by.” For example, the fraction $\frac{1}{10}$ can mean “1 divided by 10.” If you do the division, you get a decimal number that has the same value as the fraction. The division can be done on your **calculator**.

Press .

The display will show the decimal number

0.1

, which has the same value as the fraction $\frac{1}{10}$.



6. Use your calculator to change the following fractions into decimal numbers. Write the answers from the calculator display.

a. $\frac{2}{10} =$ _____

b. $\frac{9}{10} =$ _____

c. $\frac{4}{10} =$ _____

d. $\frac{1}{10} =$ _____




Check your answers in the Appendix.

Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice	
	Addition/Subtraction Number Facts
	Number Completed in 2 Minutes _____
	Number Correct in 2 Minutes _____
	Record your score on the Number Facts Progress Chart.

7. Addition/Subtraction Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 4 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ - 0 \\ \hline \end{array}$$

$7 + 2 =$

$9 + 6 =$

$3 + 1 =$

$16 - 7 =$

$4 - 4 =$

$$\begin{array}{r} 9 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline \end{array}$$

$6 + 0 =$

$8 + 7 =$

$10 - 5 =$

$3 - 2 =$

$7 + 6 =$

$$\begin{array}{r} 9 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline \end{array}$$

Check your answers in the Appendix.



JUST FOR FUN



Play “Match-Up”

Materials: the Match-Up number cards from Day 6 of the Cut-Out Learning Aids section in the Appendix

Number of players: 2 or 3

Instructions: Cut out the Match-Up cards, shuffle them, and deal them to the players. If there are two players, each player gets nine cards. If there are three players, each player gets six cards. Place the rest of the cards face-down in a pile. Each player, in turn, picks up one card from the pile and tries to make a “match-up” set—one picture, one fraction, and one decimal number that all have the same value.

Example:

$$\frac{1}{10}$$

0.1



If a player makes a match-up set, those three cards are placed face-up in front of the player. To end his turn, the player then discards one card from those remaining in his or her hand. The discarded card is placed face-down on the bottom of the pile. Then the next player takes a turn. Play continues until one player has no cards left. That player is the winner.



Note to the Home Instructor

For extra practice with number lines, students may want to visit this website:

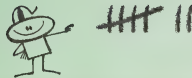
<http://www.visualfractions.com>

Choose “Identify Fractions,” which is suitable for Grade 3 and 4 students.

This is an interactive site that teaches by example and then asks for a student response to questions about fractions shown on number lines. Scores for correct answers are given. Also choose “Find Grampy,” a guessing or estimating game using number lines and fractions. Other activity choices are for more advanced ideas about fractions.

Turn to Assignment Booklet 3A, and complete the activities for Day 6.





Problem Solving

You will now take a break from fractions and decimal numbers to work on a new problem-solving strategy.

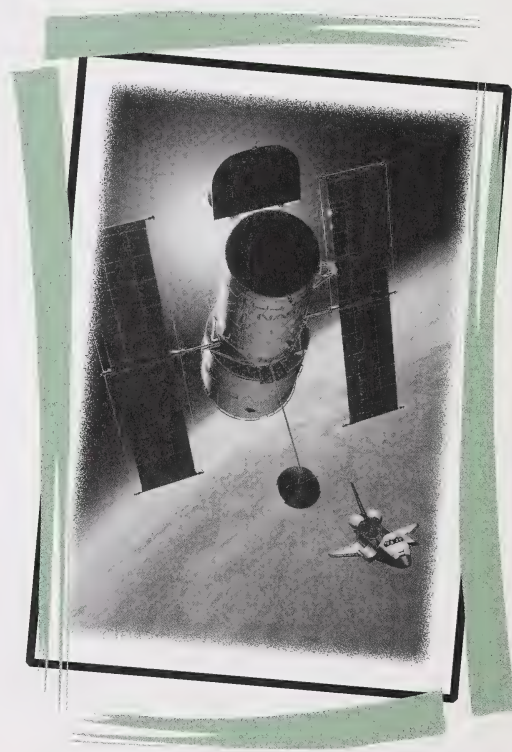
Problem-Solving Strategy: Making It Simpler



Janine got a model of the Hubble Space Telescope for her birthday. She had been following the progress of the Hubble and she was excited to have her own model of it. When she sat down to start building it, however, her excitement disappeared. The instructions were hard to follow, there were hundreds of pieces, and the pieces all looked the same!

Janine was just about to walk away from the model when she flipped over the instruction booklet and saw something interesting. There was a suggestion for a smaller version of the model made from pieces in the same kit. The smaller model would have the basic parts of the larger model, but would use only about half the pieces. The idea of the smaller model made Janine feel better because the directions were easier to follow. She put the small model together in one day. Later she added on all the other pieces to make the full-size model.

Janine's problem was made easier by starting with a smaller, simpler model. She was then able to see how the parts fit together and she could move on to the larger model.



There Has to Be a Simpler Way!

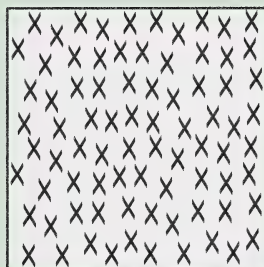
There are many ways to make a problem simpler. Today you will look at two ways:

- breaking the problem into steps
- using smaller numbers or a smaller group of numbers

Look at the following examples of ways to make problems simpler.

Example

About how many Xs are there in this square?



Step 1: Understand the problem.

You are being asked to estimate **about how many**, not an exact number, so you don't need to count all the Xs.

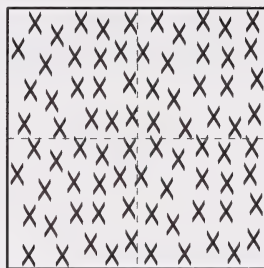
Step 2: Make a plan. (Choose a strategy.)

Estimating this large number of Xs is fairly difficult. Use the Making It Simpler strategy to reduce the number of Xs you have to estimate at one time.

Step 3: Try the plan.

To make this problem simpler, break the estimating task into smaller steps.

- Divide the square into smaller parts, such as fourths.



- Count or estimate the Xs in one of the parts. This is easier than counting all of them. For example, the bottom right fourth of the square contains 20 Xs.
- Since all four parts of the square are equal in size, you can multiply 20 Xs by 4 to get the number of Xs in the whole square. This is not an exact answer because the fourths may not all contain the same number of Xs. It is an estimate.

$$20 \times 4 = 80$$



ANSWER TO THE PROBLEM

There are about 80 Xs in the whole square.

Step 4: Look back.

By dividing the large square into smaller parts and doing the estimate in steps, the problem was made simpler and easier.

Check to make sure that you counted correctly when finding the number of Xs in one fourth of the large square.

Ask yourself if the final estimate seems reasonable.

Check to see that your sentence answer answers the question asked in the problem.

Example



Find the mystery numbers which fit the following clues.

- The numbers are between 1 and 40.
- They are all even numbers.
- Each number has two digits.
- Each number can be divided evenly by 2, 3, and 4.

Step 1: Understand the problem.

1. What do you need to find?

2. Do you know how many numbers there will be? _____

Check your answers in the Appendix.



Step 2: Make a plan. (Choose a strategy.)

The clues tell you that the mystery numbers are even and that they are between 1 and 40. You also know that each number has two digits. That still leaves a lot of numbers to check.

Use the Making It Simpler strategy. Try to find the solution in a smaller group of numbers first. Then move on to the bigger group.

Step 3: Try the plan.

Make it simpler by starting with the numbers between 1 and 20.

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20		

From the clues, you know that the mystery numbers must have **two digits**. This means they must be **greater than 9**.

3. What numbers between 1 and 20 are greater than 9?

Now your group of numbers has been made smaller.

The mystery numbers must also be **even** numbers. Make your group of numbers smaller again.

4. What numbers from question 3 are even numbers?

The final clue says the numbers can be divided by 2, 3, and 4.

5. Which of the numbers in question 4 can be divided evenly by 2, 3, and 4? Show your calculations.



Check your answers in the Appendix.

Now you can look at the rest of the numbers between 1 and 40 to see if you can find any other numbers that fit the clues.

All of the numbers between 21 and 40 have **two digits**. The **even** numbers out of this group are

22	24	26	28	30
32	34	36	38	40

6. Which of these numbers can be divided evenly by 2, 3, and 4? Show your calculations.



Check your answers in the Appendix.

7. Write your answer to the problem here.

ANSWER TO THE PROBLEM



Check your answers in the Appendix.

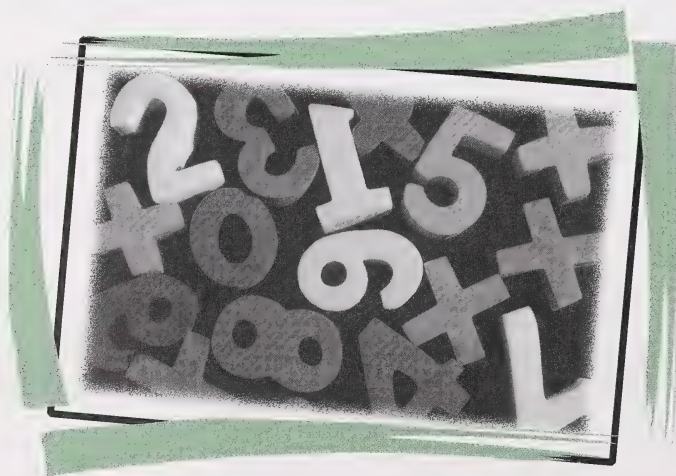
Step 4: Look back.

By making the large group into two smaller groups, the problem was made simpler and easier. If the clue had said to use the numbers between 1 and 100, perhaps you would have made five smaller groups.

Check to see that your answer makes sense and that it answers the question asked in the problem.

Check back to make sure that each of the three numbers agree with each of the clues.

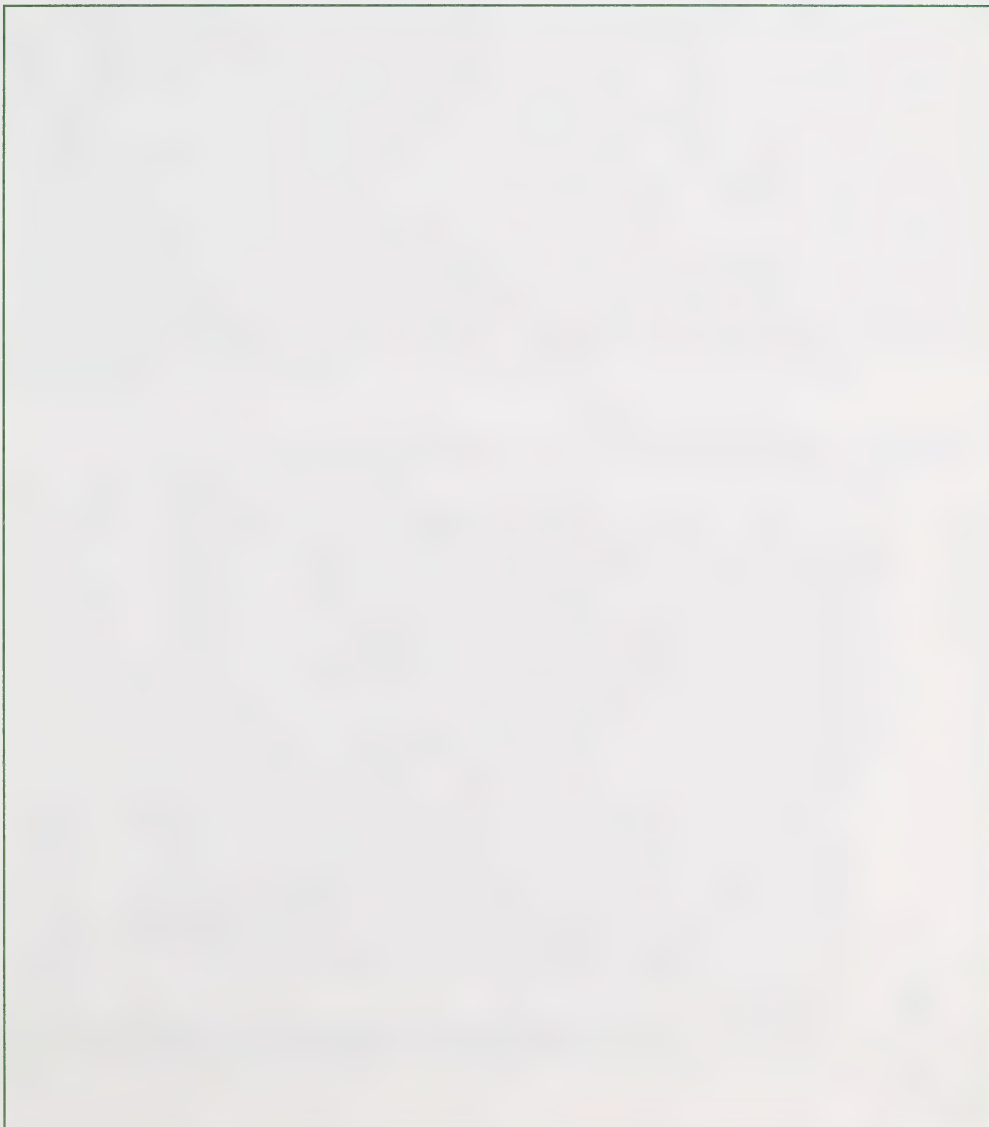
Check to see if you missed any numbers.



8. Find the mystery numbers between 1 and 40. Use these clues to help you:

- The numbers are odd.
- The numbers have two digits.
- The numbers are divisible by 3.

Show your thinking in the space provided.

A large, empty rectangular box with a thin black border, intended for students to show their work or thinking in response to the problem.

9. Parking meter rates are shown below.

Parking meter rates: 1 hour – \$2

$\frac{1}{2}$ hour – \$1

$\frac{1}{4}$ hour – \$0.50



What is the largest amount of money that 8 parking meters can collect in $2\frac{1}{2}$ hours? Make the problem simpler by finding the amount of money collected for 1 parking meter first. Then solve to find the amount for 8 parking meters.



Check your answers in the Appendix.



Note to the Home Instructor

Have the student work through some of the problems at these sites to help improve problem solving skills.

- <http://www.mathstories.com>

This site has many word problems about various concepts in several grade levels. Choose the appropriate level and look for problems on fractions. Answers to problems are included. (**Note:** There are some references to measurements that are not in metric units.)

- <http://forum.swarthmore.edu>

Choose Problem of the Week or Dr. Math to find examples of many kinds of mathematical problems suitable for Grade 4 students.

- <http://www.eduplace.com>

Choose the Grade 3–4 level brainteasers to help develop problem solving skills. (**Note:** This site is produced by Houghton Mifflin and includes non-metric units in several of the problems.)



Summing Up

In Section 1, you learned many important things about fractions and decimals:

- Fractions are numbers that show less than one whole object or whole set.
- Fractions stand for equal parts of a whole object or equal parts of a whole set.
- Fractions are made up of a numerator and a denominator.
- Fractions showing tenths can be named with decimal numbers.
- Fractions and decimals may be shown with base ten blocks, on a number line, and with lined square paper.
- Decimal values may be found by working with fractions and a calculator.
- Breaking a problem into smaller parts to make it simpler will help you solve a difficult math problem.

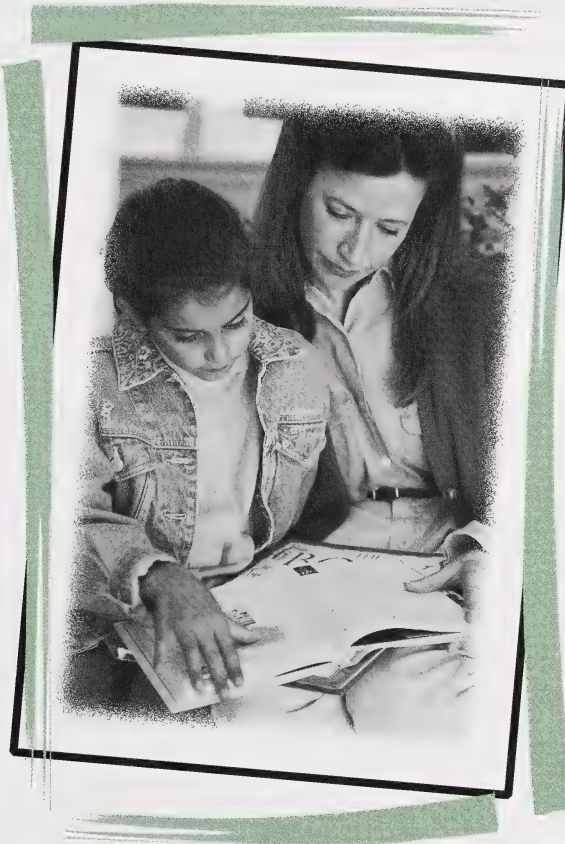
You will use what you have learned in Section 1 as you continue to study fractions and decimals in Section 2.

Turn to Assignment Booklet 3A, and complete the activities for Day 7.





Assessing What You Know (I)



Today is the last day you will be working on Section 1: Fractions. You are to complete two activities in Assignment Booklet 3A:

- Showing What You Can Do
- Basic Number Facts

Read the explanation of the activities in Parts 1 and 2 before turning to Assignment Booklet 3A. Note that you will need the help of your home instructor for both activities.

Part 1: Showing What You Can Do



For this activity you will need the help of your home instructor. You will be working on a short activity while your home instructor observes you. As you answer the questions, try to explain clearly what you are doing.

Your home instructor may ask you questions like the following:

- “How do you know that?”
- “Why did you decide to do that?”
- “How did you get that answer?”

Your job is to explain what you are doing so that your home instructor can understand your thinking.



Note to the Home Instructor

This performance assessment should take about 30 minutes. The Home Instructor’s Assessment Page and accompanying Student’s Assessment Page can be found in Day 8 of Assignment Booklet 3A. Remove both pages from the Assignment Booklet. Read over the student’s page so you are familiar with the student’s assigned task. You should also preview the interview questions and the checklist before the student begins working on the assigned task.

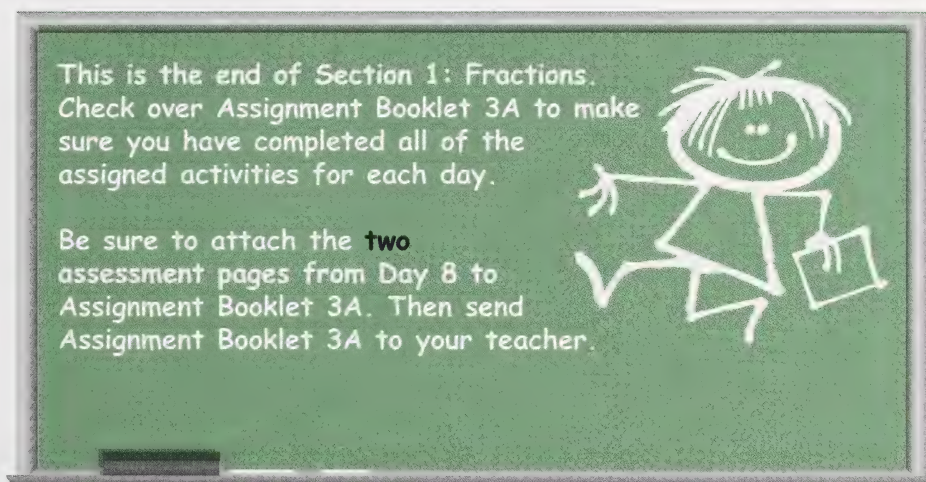
As the student works to answer the questions, encourage him or her to talk about what he or she is doing. **Allow the student to use any manipulatives or cut-out learning aids available to help solve the problem.** You may or may not wish to use some of the interview questions. Look for understanding and the student’s ability to explain clearly what he or she is doing to arrive at an answer. Indicate on the checklist whether you feel the student demonstrated the skills being assessed.

Attach both assessment pages to the Assignment Booklet before sending it in for marking.

Part 2: Basic Number Facts

In this activity you will show how well you are doing at learning your basic number facts for addition, subtraction, and multiplication. Your home instructor will time you as you do each test.

When your home instructor is ready, turn to the activities for Day 8 in Assignment Booklet 3A.

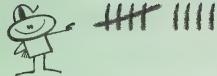




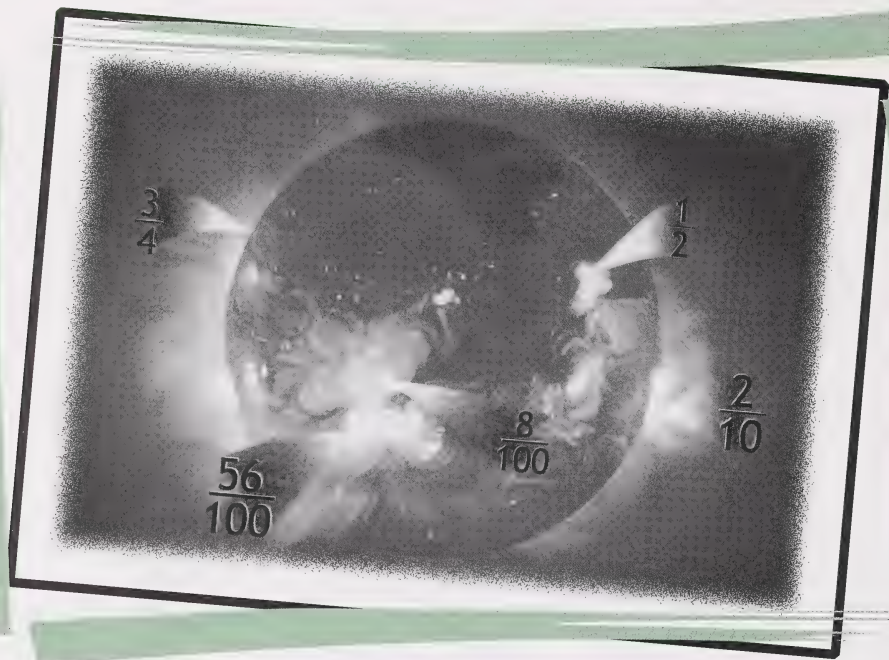
Section 2

Decimals





New Fractions



In Section 1 the spotlight was on fractions and decimals as **tenths**. Section 2 will introduce you to a new group of fractions and decimals—the **hundredths**.

In Section 2 you will

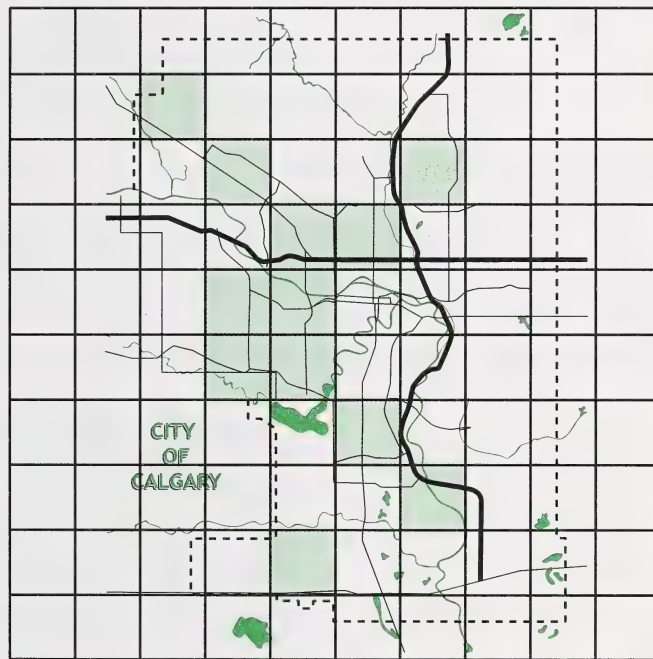
- learn to read, write, and show hundredths
- learn about the connection between hundredths and money
- solve problems using hundredths

It's time to expand your fraction universe. Start by looking at how the police connect maps and fractions to prevent crime.

Police Force Fractions

In Calgary, the police study the locations of robberies to see if there are any patterns they can use to help prevent more robberies. They divide a map of the city into 100 squares. Each week they colour the areas where there have been robberies.

1. Study the following map of Calgary. Look at the **shaded** squares that show where there have been robberies.



- a. How many squares are there altogether? _____
- b. How many squares are shaded? _____
- c. Write a fraction that tells how many areas of the city had robberies that week. _____

Check your answers in the Appendix.



Meet the New Fractions

In Police Force Fractions, you were introduced to a new group of fractions—the **hundredths**. You might not have written your answer as a fraction, but you saw that 12 parts out of a total of 100 parts were shaded. This means that you can recognize hundredths.

Now you will find out how hundredths fit into the growing fraction family!

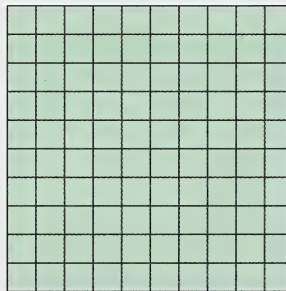
Remember, five equal parts show **fifths**.



Ten equal parts show **tenths**.



One hundred equal parts show **hundredths**.



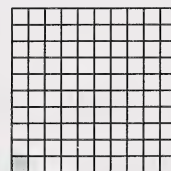
If you use a whole square or flat to show ones, then you can show tenths and hundredths as follows:



One (1)

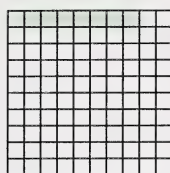


One tenth $\left(\frac{1}{10}\right)$

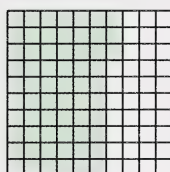


One hundredth $\left(\frac{1}{100}\right)$

Like other fractions, hundredths can show parts of a whole.

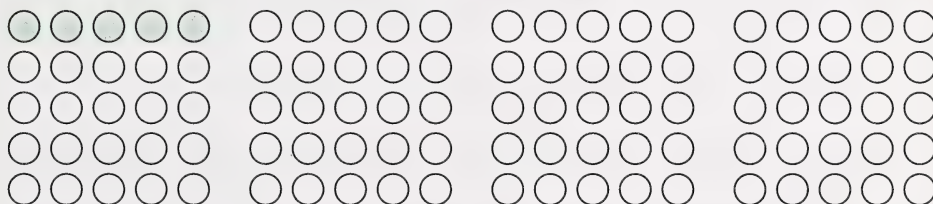


$$= \frac{8}{100} \text{ (eight hundredths)}$$



$$= \frac{63}{100} \text{ (sixty-three hundredths)}$$

Hundredths can also show parts of a set of objects.



$$= \frac{5}{100} \text{ (five hundredths)}$$



$$= \frac{31}{100} \text{ (thirty-one hundredths)}$$

Now practise reading and drawing fractions in hundredths by completing the following questions.



2. Turn to pages 154 and 155 in your textbook. Complete questions 4, 5, and 6 of On Your Own. You may use the 10×10 grids found in Day 9 of the Cut-Out Learning Aids section of the Appendix to help with your answers.



On Your Own, Question 4

- How many long orange strips are needed to cover the 10×10 grid completely? _____
- What fraction of the grid does one orange strip represent? _____
- How many blue squares are needed? _____
- What fraction of the grid does one square represent? _____

On Your Own, Question 5

How many strips and squares would be needed to show $\frac{38}{100}$?

_____ strips _____ squares

On Your Own, Question 6

Ways to show $\frac{25}{100}$ using strips and squares:

- _____
- _____
- _____



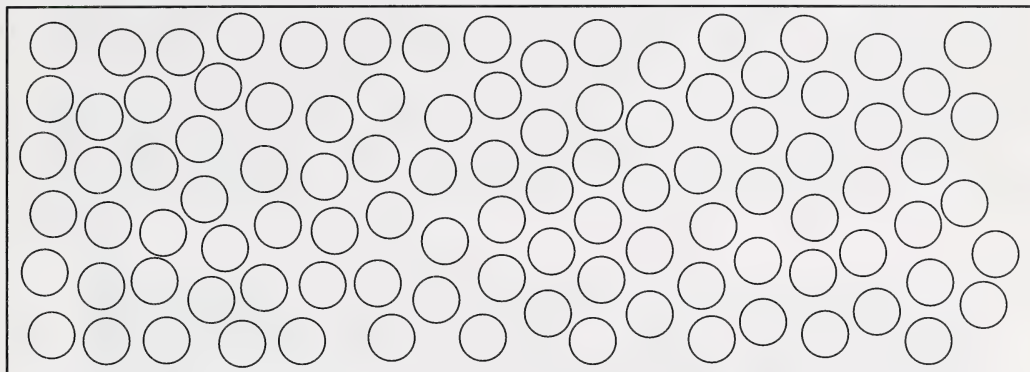
Check your answers in the Appendix.



3. Turn to page 155 in your textbook. Do question 8 of Practise Your Skills.

Practise Your Skills, Question 8: _____

4. Mr. T. Shot has a collection of 100 golf balls. Some are orange and some are white.



a. If $\frac{5}{100}$ of the golf balls are orange, what fraction of the balls are

white? _____

b. In the box above, colour the golf balls to show the fraction of the total number of balls that are **orange**.

c. If $\frac{25}{100}$ of the golf balls were orange, how many balls would you

colour? _____



Check your answers in the Appendix.

Word Problems and Hundredths

5. There are 100 coloured balloons that need to be blown up for a party:

- 30 red balloons
- 25 green balloons
- 40 blue balloons
- 5 black balloons

Colour the correct number of hundredths squares on the grid to show the fraction of balloons that are red, green, blue, and black. Then write the fraction for each colour in the spaces provided.

- Red: _____
- Green: _____
- Blue: _____
- Black: _____

Check your answers in the Appendix.



Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.


Basic Number Facts Practice

Addition/Subtraction Number Facts

Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.



6. Addition/Subtraction Number Facts
Timed Exercise: 2 minutes

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 0 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ - 7 \\ \hline \end{array}$$

$4 + 7 =$

$3 + 5 =$

$10 - 1 =$

$9 + 4 =$

$6 - 2 =$

$$\begin{array}{r} 0 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 7 \\ \hline \end{array}$$

$3 - 2 =$

$12 - 6 =$

$9 + 8 =$

$15 - 7 =$

$2 + 4 =$

$$\begin{array}{r} 14 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 3B, and complete the activities for Day 9.



New Decimals



Flats, Rods, and . . . ?

It is time to meet another member of the decimal family—the **hundredth**. Your first task is to think about how you will show hundredths. So far, you have used the **flat** for ones and the **rod** for tenths. Now you must show hundredths, which are $\frac{1}{10}$ of the size of the tenths.

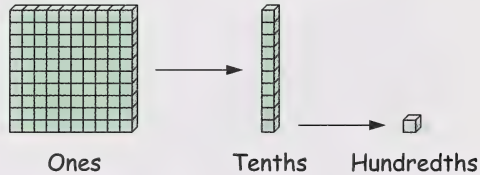
1. Which base ten piece should be used to show hundredths?

Check your answer in the Appendix.




A Growing Family

The base ten decimal family now looks like this:

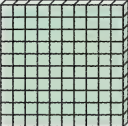




Where do hundredths fit into the place-value chart? Hundredths are smaller than tenths, so the hundredths place is to the right of the tenths.

Hundreds	Tens	Ones	Tenths	Hundredths


 ↑
 Decimal point

The base ten blocks for ones, tenths, and hundredths fit into the place-value chart like this.

Ones	Tenths	Hundredths
		

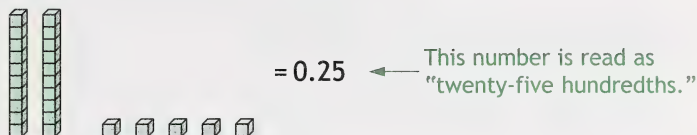


Remove the two pages for the Base Ten Decimal Mat and the base ten blocks from Day 10 in the Cut-Out Learning Aids section of the Appendix. Tape the pages together to make the mat. Use your mat and base ten blocks to follow along with the examples.

If a decimal number is modelled with both rods (**tenths**) and cubes (**hundredths**), it is written with two decimal places.

Example

Show 0.25 with your base ten blocks.



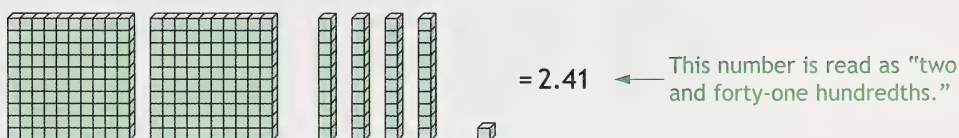
On a place-value chart, this number would be written as follows.

Ones	Tenths	Hundredths
0	2	5

↑
There are no flats (ones).

Example

Show 2.41 with your base ten blocks.



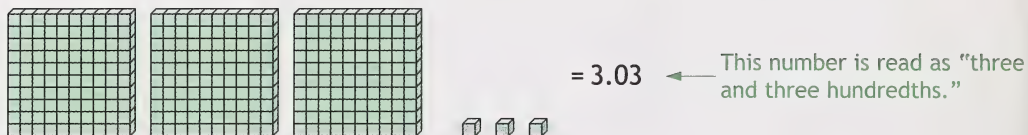
On a place-value chart, this number would be written as follows.

Ones	Tenths	Hundredths
2	4	1

If a decimal number is modelled with cubes (**hundredths**) but no rods, it is written with a zero in the tenths place to show that there are no tenths.

Example

Show 3.03 with base ten blocks.

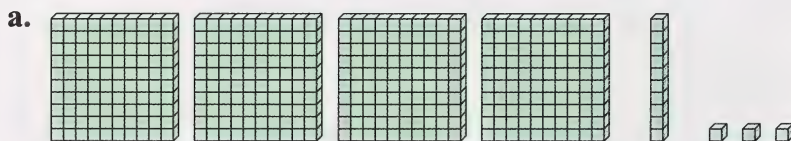


On a place-value chart, this number would be written as follows.

Ones	Tenths	Hundredths
3	0	3

↑
There are no tenths (rods).

2. Write the decimal numbers shown by the base ten blocks in the place-value charts.



Ones	Tenths	Hundredths



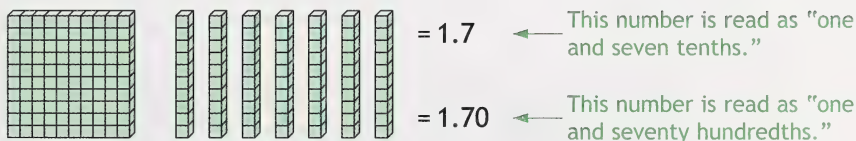
Ones	Tenths	Hundredths



Check your answers in the Appendix.

If a base ten model has rods (**tenths**) but no cubes (**hundredths**), it is usually written with only one decimal place. However, you may write a zero in the hundredths place if you wish.

Example



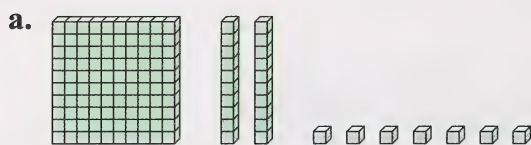
Note that 1.7 and 1.70 show exactly the same value (one flat and seven rods). Placing a zero in the hundredths place does **not** change the value of the number.

On a place-value chart, this number would be shown as follows.

Ones	Tenths	Hundredths
1	7	
1	7	0

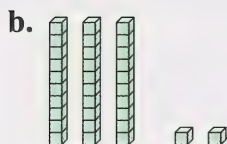
There are no hundredths (cubes).

3. Look at the following base ten models of decimal numbers. Write each number in both numbers and words.



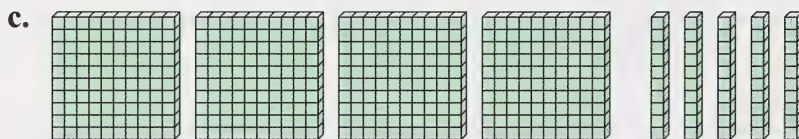
Numbers: _____

Words: _____



Numbers: _____

Words: _____



Numbers: _____

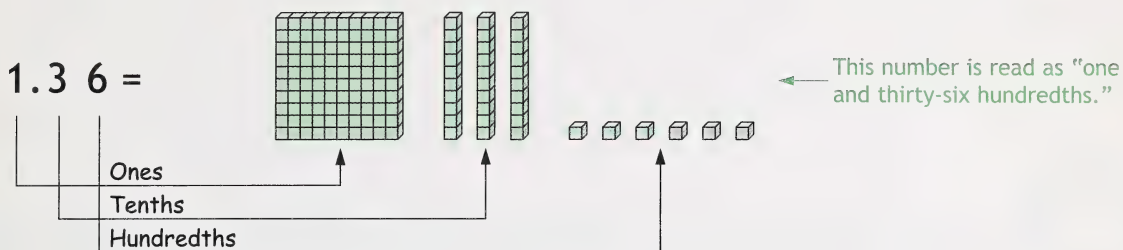
Words: _____



Check your answers in the Appendix.

You can also read decimal numbers and show them with base ten models.

Examples



$0.08 =$  ← This number is read as "eight hundredths."

4. Show the following decimal numbers with base ten blocks. You will have to glue the cutouts in place.

a. 0.49

b. 5.03



c. 0.06



Check your answers in the Appendix.

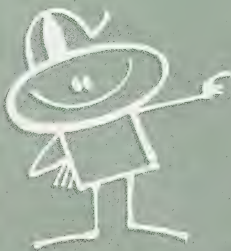
Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Division Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

5. Division Number Facts
Timed Exercise: 2 minutes

$$2 \overline{)4}$$

$$6 \overline{)12}$$

$$1 \overline{)5}$$

$$6 \overline{)24}$$

$$3 \overline{)15}$$

$$16 \div 4 =$$

$$28 \div 4 =$$

$$49 \div 7 =$$

$$5 \div 5 =$$

$$6 \div 2 =$$

$$5 \overline{)25}$$

$$3 \overline{)21}$$

$$7 \overline{)14}$$

$$5 \overline{)35}$$

$$6 \overline{)18}$$

$$2 \div 1 =$$

$$10 \div 2 =$$

$$6 \div 3 =$$

$$42 \div 7 =$$

$$12 \div 4 =$$

$$6 \overline{)6}$$

$$6 \overline{)36}$$

$$5 \overline{)30}$$

$$7 \overline{)21}$$

$$3 \overline{)9}$$



Check your answers in the Appendix.



Just For Fun

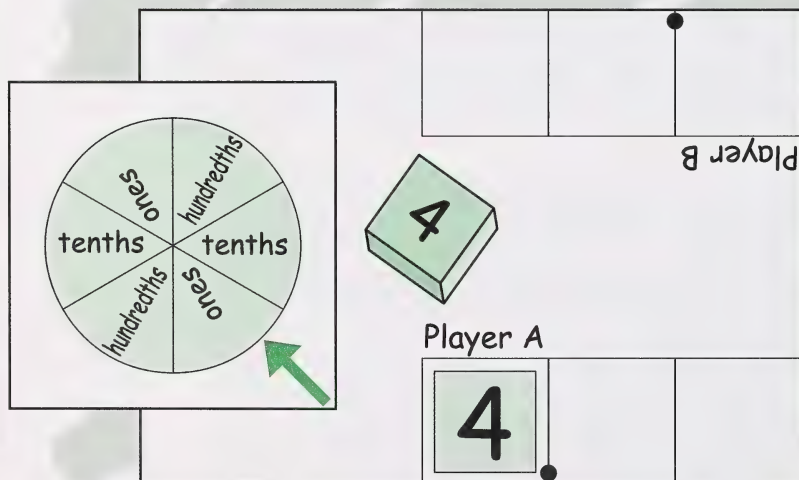


Play “Spin a Decimal.” This game is a fun way to practise reading and writing decimal numbers.

Number of Players: 2

What You Need: • number cube, number squares, game board, and spinner from the Appendix

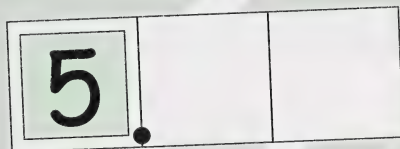
- pencil and paper for keeping score



Directions:

- Remove the spinner, game board, and number cube pages from Day 10 of the Appendix.
- Put the spinner together.
- Cut out the number cube net. Number the sides from 4 to 9. Fold and tape the edges together.
- Cut out the number squares.
- Take turns rolling the number cube and spinning the spinner at the same time. The number rolled is written in the place shown by the spinner.

For example, Player 1 might throw a **5** with the number cube and spin **ones** with the spinner. This means that a square with the number **5** should be placed in the **ones** place on the game board.



If a player spins a place that is already filled, the player loses that turn. After five turns each, any places that are still empty are filled in with zeros. The player who has the largest number gets 5 points.

- Keep a record of each player's points. The winner is the first person to reach 25 points.

Turn to Assignment Booklet 3B, and complete the activities for Day 10.



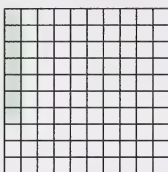


Working with Tenths and Hundredths

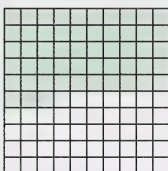
Showing Hundredths

In Day 9 you used 10×10 grids to show **fractions** in hundredths.

Example



$$= \frac{7}{10} \text{ (seven tenths)}$$



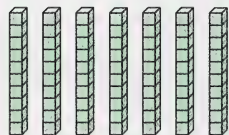
$$= \frac{53}{100} \text{ (fifty-three hundredths)}$$

In Day 10 you used base ten models to show **decimal numbers** in hundredths.

Example



$$= 0.17 \text{ (seventeen hundredths)}$$



$$= 0.72 \text{ (seventy-two hundredths)}$$

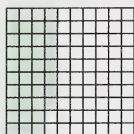
Today you will show the connection between fractions and decimal numbers by showing hundredths using both 10×10 grids and base ten models.



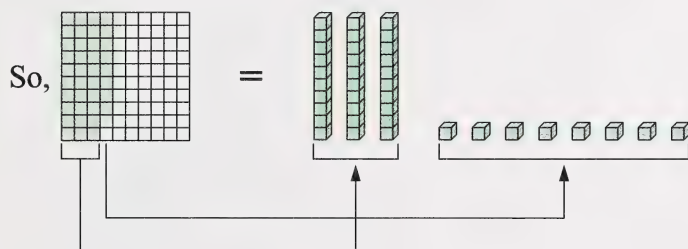
Use your base ten blocks to follow along with the next few examples.

Example

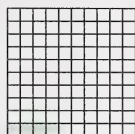
Show the following fraction as a base ten model.



The 10×10 grid shows the fraction **thirty-eight hundredths** $\left(\frac{38}{100}\right)$. Thirty-eight hundredths means **3 tenths** plus **8 hundredths**. Using base ten blocks, 3 tenths means **3 rods** and 8 hundredths means **8 cubes**.



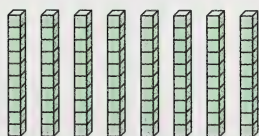
Example




=  (four hundredths)

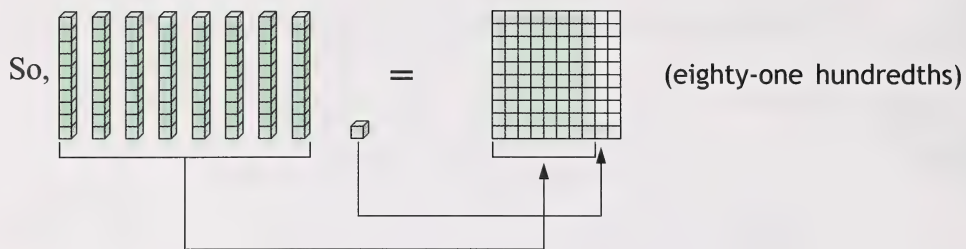
You can also change base ten decimal numbers to fractions.

Example



 This means 8 tenths plus 1 hundredth.

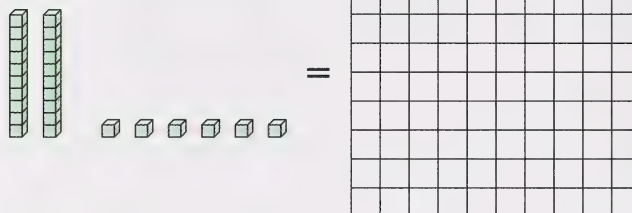
8 tenths + 1 hundredth = **81 hundredths**



Complete the following questions about decimal numbers and fractions. Use the cut-out 10×10 grids and base ten blocks from Day 11 of the Cut-Out Learning Aids section of the Appendix.

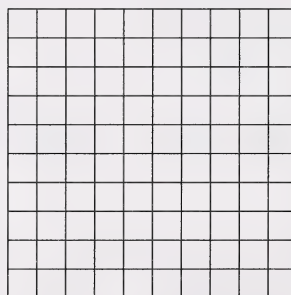
1. Change the following base ten decimals to 10×10 grid fractions. Then write the numbers in words.

a.



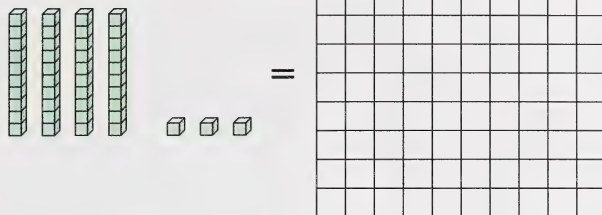
Words: _____

b.  =



Words: _____

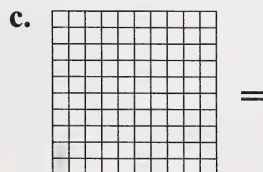
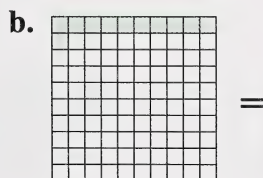
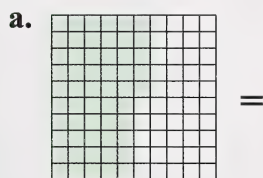
c.



Words: _____

Check your answers in the Appendix.

2. Change the following fractions into base ten decimals. Draw or paste in base ten pieces to complete the questions.



Check your answers in the Appendix.

3. Show each number with a base ten model and a 10×10 grid. Draw or use your cutouts to complete the questions.

a. ninety hundredths

b. twenty-six hundredths



Check your answers in the Appendix.

Taking Another Look

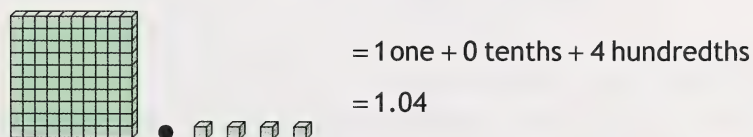
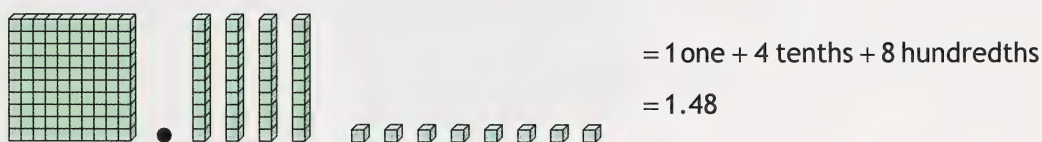
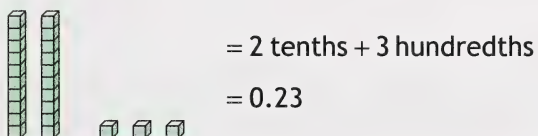
The following activity is optional. You may choose to do it or not. You **should** complete the activity if you are having difficulty reading and writing decimal numbers.

If you choose **not** to do the questions at this time, you may wish to return here later and complete the page before going on to the review activities for Day 14.

Decimals in Parts

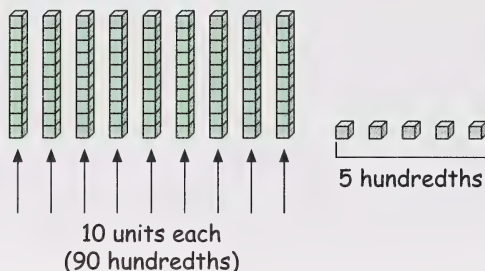
Decimal numbers can be broken into parts to show place values and to match them with the base ten flats, rods, and cubes. This can help you to read and write the numbers.

Example



You can also think about decimals this way.

$$0.95 = 9 \text{ tenths} + 5 \text{ hundredths}$$



Think of each of these tenths rods as **10** hundredths.

Nine rods equal 90 hundredths.

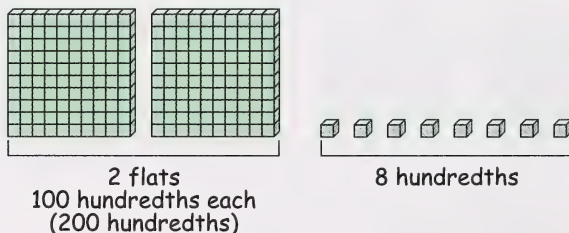
Add 90 to the 5 hundredth cubes already there.

$$90 + 5 = 95 \text{ hundredths}$$

$$0.95 = 95 \text{ hundredths}$$

Here is another example.

$$2.08 = 2 \text{ ones} + 0 \text{ tenths} + 8 \text{ hundredths}$$



Let each flat equal 100 hundredths.

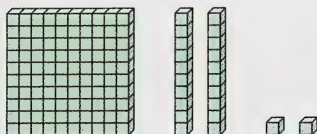
Two flats (ones) are equal to 200 hundredths.

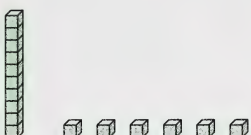
Add 200 to the 8 hundredths already there.

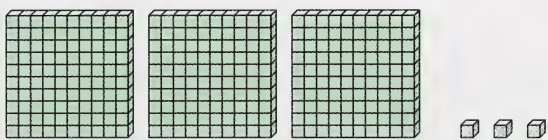
$$200 + 8 = 208 \text{ hundredths}$$

$$2.08 = 208 \text{ hundredths}$$

4. Fill in the blanks with the correct place values and decimal numbers.

a.  = 1 one + _____ tenths + _____ hundredths
= 1.22

b.  = _____ ones + 1 tenth + _____ hundredths
= _____

c.  = _____ ones + _____ tenths + _____ hundredths
= _____

Check your answers in the Appendix.

5. Fill in the blanks with the correct numbers.

a. $0.39 =$ _____ hundredths

b. $1.37 =$ _____ hundredths

c. $5.04 =$ _____ hundredths

d. $0.2 =$ _____ hundredths

Check your answers in the Appendix.

Here's another way to think about decimal parts. If you are given the place values of each part, you can write the decimal number.

Ones	Tenths	Hundredths	Decimal Number
1	5	6	1.56
0	0	7	0.07
5	8	0	5.80

Notice that the decimal point is between the ones and the tenths.

6. Use the place values to write the decimal numbers in the chart below.

Ones	Tenths	Hundredths	Decimal Number
0	7	5	
7	3	0	
1	1	9	
0	0	1	



Check your answers in the Appendix.

Basic Number Facts Practice




Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.



Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

7. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$$

$0 \times 3 =$

$7 \times 7 =$

$6 \times 4 =$

$3 \times 5 =$

$2 \times 6 =$

$$\begin{array}{r} 3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$4 \times 5 =$

$5 \times 0 =$

$6 \times 7 =$

$5 \times 2 =$

$4 \times 4 =$

$$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 3B, and complete the activities for Day 11.





Fractions and Decimals—Number Neighbours

Changing Fractions to Decimals

How do you change fractions to decimal numbers?

Example

What is $\frac{24}{100}$ as a decimal number?

First, name the fraction in **words**. The words will help you picture the place values of the decimal number.

The fraction $\frac{24}{100}$ is **twenty-four hundredths**. Twenty-four hundredths is **2 tenths** plus **4 hundredths**.

Ones	Tenths	Hundredths
	2	4

To write $\frac{24}{100}$ as a decimal number, you would write **0.24**.

Following are some other examples of switching fractions to decimal numbers.

$$\bullet \frac{69}{100} = 0.69 \quad (\text{sixty-nine hundredths})$$

Diagram illustrating the conversion of $\frac{69}{100}$ to 0.69. The fraction is shown with a decimal point. The denominator 100 is underlined. Above the fraction, the word "hundredths" is written, and below it, the word "tenths" is written. Arrows point from "hundredths" to the 69 and from "tenths" to the 69. The decimal 0.69 is shown to the right of the fraction.

— The denominator tells you that the number is in **hundredths**.

$$\bullet \frac{3}{100} = 0.03 \quad (\text{three hundredths})$$

Remember to place a zero in the tenths place when there are less than 10 hundredths.

$$\bullet \frac{90}{100} = 0.90 \text{ or } 0.9 \quad (\text{ninety hundredths or nine tenths})$$

The zero in the hundredths place may be removed.

1. Write each fraction as a decimal number.

a. $\frac{17}{100} =$ _____

b. $\frac{9}{100} =$ _____

c. $\frac{40}{100} =$ _____

d. $\frac{56}{100} =$ _____



Check your answers in the Appendix.



Now, put the engine in reverse and change decimal numbers to fractions!

Again, if you say the decimal number in **words**, you can picture the fraction more easily. For example, the decimal number 0.45 is read as “forty-five hundredths.” **Hundredths** tells you that there are 100 total parts (the denominator), and **forty-five** tells you the number of parts out of the total (the numerator).

So, $0.\overbrace{45} = \frac{45}{100}$.

Example

• $0.\overbrace{86} = \frac{86}{100}$ (eighty-six hundredths)

Two decimal places means hundredths.

• $0.\overbrace{05} = \frac{5}{100}$ (five hundredths)

The zero in the decimal is removed in the fraction.

2. Turn to page 157 in your textbook. Do questions 1 to 4 in Practise Your Skills.

Practise Your Skills, Question 1

Write each fraction as a decimal number.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____

h. _____

Practise Your Skills, Question 2

Write each decimal number as a fraction.

a. _____

b. _____

c. _____

d. _____

Practise Your Skills, Question 3

Write each as a fraction and a decimal number.

a. _____

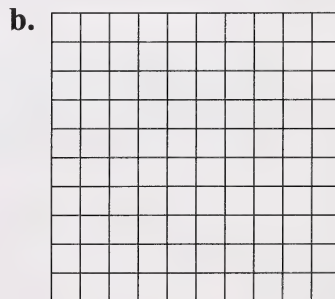
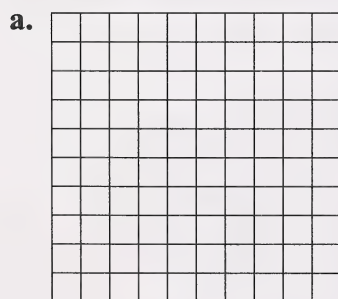
b. _____

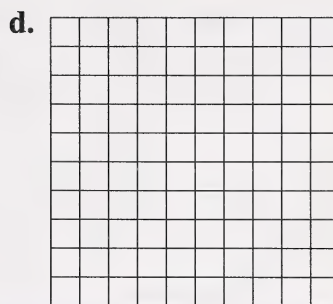
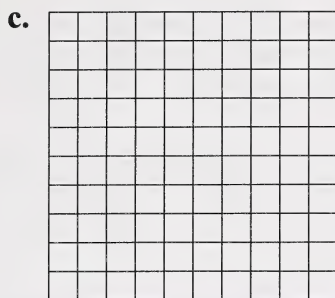
c. _____

d. _____

Practise Your Skills, Question 4

Use 10×10 grids to show each number in Practise Your Skills question 3.

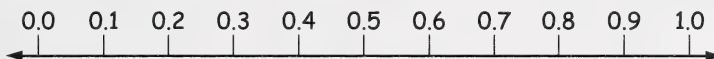




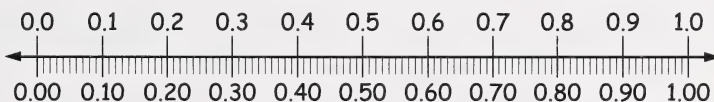
Check your answers in the Appendix.

Line Up, Please!

Earlier in this module you saw how tenths are shown on a number line.



Now, add **hundredths** to the number line and see how this helps you to read decimal numbers.



If you look closely at the number line, you will see that there are tiny marks that divide the line into equal parts. Each of these parts is **one hundredth**.

- There are 10 hundredths between 0.00 and 0.10.
- There are 10 hundredths between 0.20 and 0.30.
- There are 10 hundredths spaces between 0.80 and 0.90.
- There are 100 hundredths between 0.00 and 1.00.

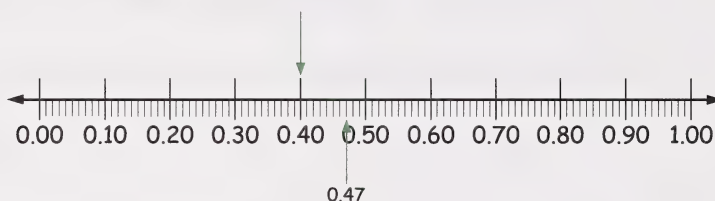
To count the hundredths along a number line quickly, you can count by groups of 10. You could also count hundredths by counting the spaces one at a time. This might take a long time, though.

Is there another way to find a decimal number with hundredths on a number line?

Example

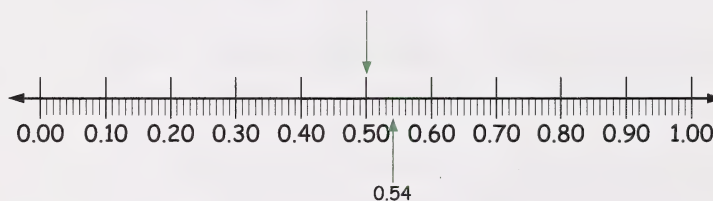
Find the decimal number **0.47** on the number line.

First, look for the number **0.40** on the number line.

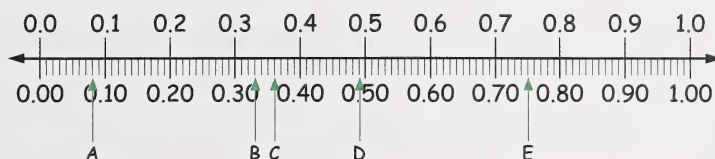


Then count **7** hundredths spaces to the right to arrive at 0.47.

Try finding the number **0.54** in the same way. Go to **0.50** first and then count **4** hundredths spaces to the right.



3. Read and write the decimal numbers at letters A to E on the number line. Also write the numbers in words. Put your answers in the chart that follows.



	Number	Words
A		
B		
C		
D		
E		

4. Fill in the decimal numbers missing in this sequence.

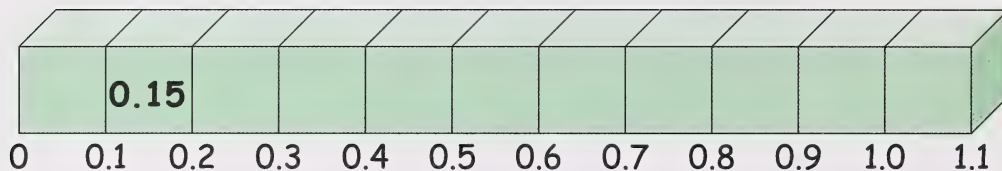
0.28, _____, 0.30, _____, _____, 0.33

5. In your own words, tell how you would find the number **0.67** on a hundredths number line.

6. What does a number line tell you about the values of the decimal numbers **0.4** and **0.40**?

7. Write each of the following numbers in the box where it belongs. The first one has been done for you.

0.15, 0.69, 0.21, 1.04, 0.48



Check your answers in the Appendix.




Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Division Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

8. Division Number Facts
Timed Exercise: 2 minutes

$6 \overline{)18}$

$2 \overline{)4}$

$3 \overline{)12}$

$5 \overline{)30}$

$1 \overline{)7}$

$14 \div 2 =$

$36 \div 6 =$

$35 \div 7 =$

$4 \div 4 =$

$9 \div 3 =$

$5 \overline{)10}$

$7 \overline{)28}$

$1 \overline{)2}$

$4 \overline{)16}$

$3 \overline{)15}$

$42 \div 6 =$

$3 \div 1 =$

$24 \div 4 =$

$5 \div 5 =$

$8 \div 2 =$

$5 \overline{)20}$

$3 \overline{)21}$

$6 \overline{)24}$

$7 \overline{)49}$

$2 \overline{)2}$



Check your answers in the Appendix.

Turn to Assignment Booklet 3B, and complete the activities for Day 12.



Decimal Dollars



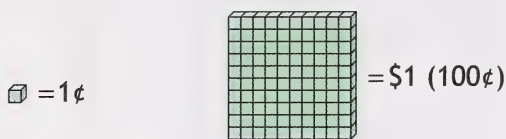
Today you will learn how money and decimal numbers are related.

1. Suneel has a collection of pennies. Suneel wants to know how much money he has in his collection. After counting, he finds that he has 145 pennies. Can you think of another way to show how much money Suneel has?

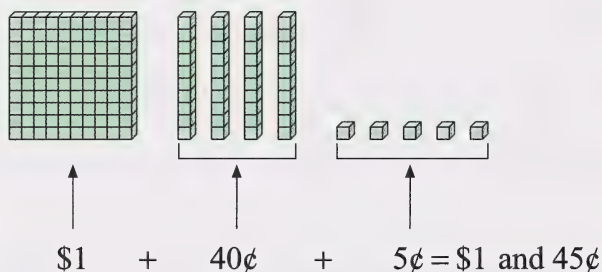
There are different ways to show how much money Suneel has. You might say that he has 145¢. But you usually think of money as **dollars** and **cents**. To change 145¢ into dollars and cents, you must use the connection between pennies and dollars.

You already know that 100¢ make a dollar. You can show this with base ten blocks.

Since the flat contains 100 small cubes, the flat can stand for \$1 and each cube can stand for 1¢.



In base ten blocks, Suneel's 145¢ is shown as 1 flat, 4 rods, and 5 cubes.



2. Show the following money amounts by pasting base ten cutouts in the answer spaces. You can find extra base ten cutouts in Day 13 of the Cut-Out Learning Aids section of the Appendix.

a. 1 dollar and 50 cents

b. 0 dollars and 64 cents

c. 4 dollars and 12 cents

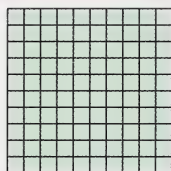
d. 2 dollars and 18 cents

e. 0 dollars and 89 cents

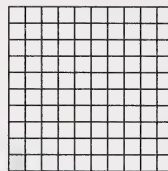


Check your answers in the Appendix.

You can also show Suneel's money with 10×10 grids. One full grid stands for \$1 and each small square stands for 1¢.

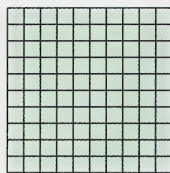


= \$1



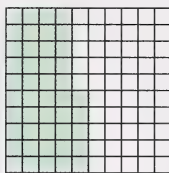
= 1¢

So, Suneel's 145¢ looks like this.



\$1

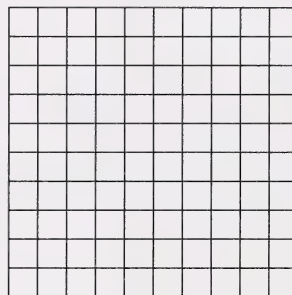
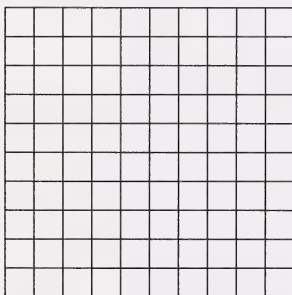
+



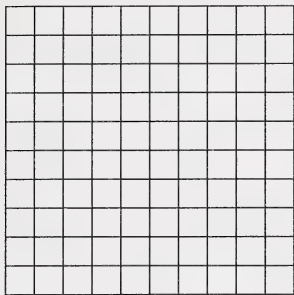
45¢ = \$1 and 45¢

3. Show the following money amounts by shading in the 10×10 grids.

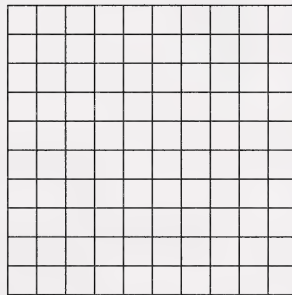
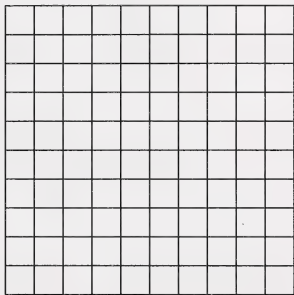
a. 1 dollar and 9 cents



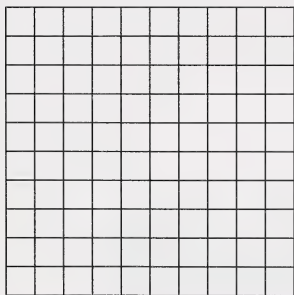
b. 0 dollars and 72 cents



c. 1 dollar and 75 cents

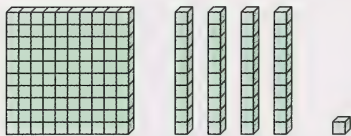


d. 0 dollars and 7 cents



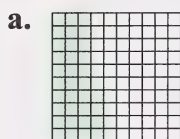
Check your answers in the Appendix.

4. Write the following money amounts in words and numbers. One has been done for you.



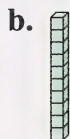
Words: 1 dollar and 41 cents

Numbers: \$1.41



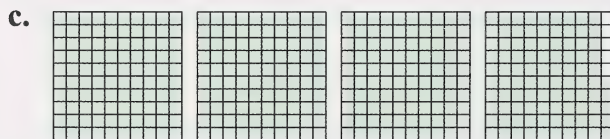
Words: _____

Numbers: _____



Words: _____

Numbers: _____



Words: _____

Numbers: _____

Check your answers in the Appendix.



Money and Decimals

It helps to think of money amounts as **decimal** numbers.

One cent is **one hundredth** (0.01) of a dollar. One cent written as a dollar amount is \$0.01.

Thirty-six cents is **thirty-six hundredths** of a dollar, or 0.36 of a dollar. Using a dollar sign, you write this amount as \$0.36.

The whole number part of the amount is the dollars. The decimal part of the amount is the cents.

Dollars
↓ Cents
\$0.36

- Other examples:
- 25 cents = \$0.25
 - 1 dollar and 48 cents = \$1.48
 - 3 dollars and 80 cents = \$3.80
 - 6 dollars and 3 cents = \$6.03

Money amounts can also be shown with **coins**. The coins can then be translated into decimal numbers to show dollars and cents.

Example

What part of a dollar is shown by the following group of coins?



$$\begin{aligned} 3 \text{ dimes} + 1 \text{ nickel} + 2 \text{ pennies} &= 30\text{¢} + 5\text{¢} + 2\text{¢} \\ &= 37\text{¢} \end{aligned}$$

Thirty-seven cents is 37 hundredths of a dollar or **0.37** of a dollar. Using a dollar sign, the amount is **\$0.37**.

5. How many dollars and cents are in each of the following groups of coins? Write each answer as a decimal amount.

a.



b.



Check your answers in the Appendix.

Note to the Home Instructor

It may be useful to use a collection of real coins to help the student work through the money problems in this section of the module. If the student has difficulty counting money, then extra time should be allowed to review and practise counting coins before the student is expected to actually write the money amounts as decimal numbers.



6. Write the following money amounts as parts of a dollar. Write your answers in **words** (e.g., twenty-one hundredths of a dollar).

a. 2 cents _____

b. 66 cents _____

Check your answers in the Appendix.

7. Write the following money amounts as decimal numbers with dollar signs (\$).

a. 60¢ = _____

b. 5 dollars and 43 cents = _____

c. eight and four hundredths dollars = _____

d. 1.79 dollars = _____

e. 3 dollars and 0 cents = _____

8. You have $\frac{65}{100}$ of a dollar. Write how much money you have as a **decimal number** with a \$. _____

9. Write the following money amounts as decimal numbers with dollar signs.

a.  _____

b. 7 dollars + 1 nickel + 1 penny _____

c.



Check your answers in the Appendix.



Mental Math



Counting by Quarters

The quarter is a 25-cent coin. It is called a quarter because 25¢ is actually one quarter or one fourth of \$1. A set of four quarters equals \$1.



Sometimes you may have a handful of quarters that you need to count. You need to know how to count by **25** if you want to count your quarters.

Skip count by 25 up to 100.



This pattern of **25, 50, 75, 100** is repeated whenever you count amounts of money or large numbers. If you know this pattern, you can learn to quickly add groups of 25.

Notice the pattern that forms when you count \$5 in quarters.

25¢	50¢	75¢	\$1
125¢	150¢	175¢	\$2
225¢	250¢	275¢	\$3
325¢	350¢	375¢	\$4
425¢	450¢	475¢	\$5

Each time you count four quarters, you are adding \$1.

Now, think of adding the following numbers together. Use the “**counting by quarters**” method that you have just learned.

Example

$$50 + 25 + 25 =$$

Count by quarters.

You might think $50 + 2 \text{ quarters} =$

$$50 + 50 = 100$$

The solution is 100.

Two quarters is 50¢.



Example

$$50 + 75 + 125 =$$

Think in quarters.

$$50 + (3 \text{ quarters}) + (5 \text{ quarters}) =$$

$$50 + 8 \text{ quarters} =$$

$$50 + 200 = 250$$

The solution is 250.

Solve these addition problems quickly in your head. (Count by quarters to add quickly!)

10. a. $125 + 25 + 25 =$ _____

b. $250 + 25 + 25 =$ _____

c. $75 + 50 + 25 =$ _____

d. $175 + 50 + 50 =$ _____

e. $225 + 25 + 50 =$ _____

f. $125 + 50 + 25 + 50 =$ _____

g. $50 + 25 + 50 + 25 =$ _____

h. $100 + 25 + 75 + 100 =$ _____

Four quarters is \$1.00,
so eight quarters is \$2.00.



Check your answers in the Appendix.

Turn to Assignment Booklet 3B, and complete the activities for Day 13.



Putting It All Together



In Section 2 you learned more about fractions and decimals. You learned that

- Objects or sets may be divided into 100 equal parts called hundredths.
- Base ten blocks may be used to show tenths and hundredths.
- Hundredths may be written as a fraction or as a decimal.
- Hundredths and tenths may be shown on a number line.
- One cent is one hundredth of \$1.
- Dollar and cent amounts are usually shown as decimal numbers.

Fractions and decimals are a very important part of mathematics. As you become familiar with them, you will use them more in school and in your daily life.

Today you will show what you have learned about fractions and decimals by completing several review questions. You will then work on a Challenge Activity related to the activities you have been working on in Section 2.

Part 1: Reviewing the Concepts

For Part 1 you will complete all of the review questions for Day 14 in Assignment Booklet 3B. First, you may wish to look back through the Student Module Booklet to review the concepts covered in the module.

Part 2: Challenge Activities

The Challenge Activities in Part 2 are designed to extend the ideas you have been learning about in Module 3 and encourage you to explore new ideas. In Assignment Booklet 3B you will find two Challenge Activities. Choose **either** Activity A **or** Activity B (**or** you may do both if you wish).

Turn to Day 14 in Assignment Booklet 3B, and complete all of the review questions in Part 1. Then do one or both of the Challenge Activities in Part 2.





Assessing What You Know (II)

This is the last day you will be working on Section 2: Decimals. You are to complete **three** activities in Assignment Booklet 3B:

- Showing What You Can Do
- Basic Number Facts
- Thinking About What You Know

Read the explanation of the activities for all three parts before turning to Assignment Booklet 3B. Note that you will need the help of your home instructor for activities in Parts 1 and 2.



Part 1: Showing What You Can Do

For this activity you will need the help of your home instructor. You will be working on a short activity while your home instructor observes you. As you work through the problem, try to explain clearly what you are doing.

Your home instructor may ask you questions like the following:

- “How do you know that?”
- “Why did you decide to do that?”
- “How did you get that answer?”



Note to the Home Instructor

This performance assessment should take about 30 minutes. The Home Instructor's Assessment Page and accompanying Student's Assessment Page can be found in Day 15 of Assignment Booklet 3B. Remove both pages from the Assignment Booklet. Read over the student's page so you are familiar with the student's assigned task. You should also preview the interview questions and the checklist before the student begins working on the assigned task.

As the student works to answer the questions, encourage him or her to talk about what he or she is doing. **Allow the student to use any manipulatives or cut-out learning aids available to help solve the problem.** You may or may not wish to use some of the interview questions. Look for understanding and the student's ability to explain clearly what he or she is doing to arrive at an answer. Indicate on the checklist whether you feel the student demonstrated the skills being assessed.

Attach both assessment pages to the Assignment Booklet before sending it in for marking.

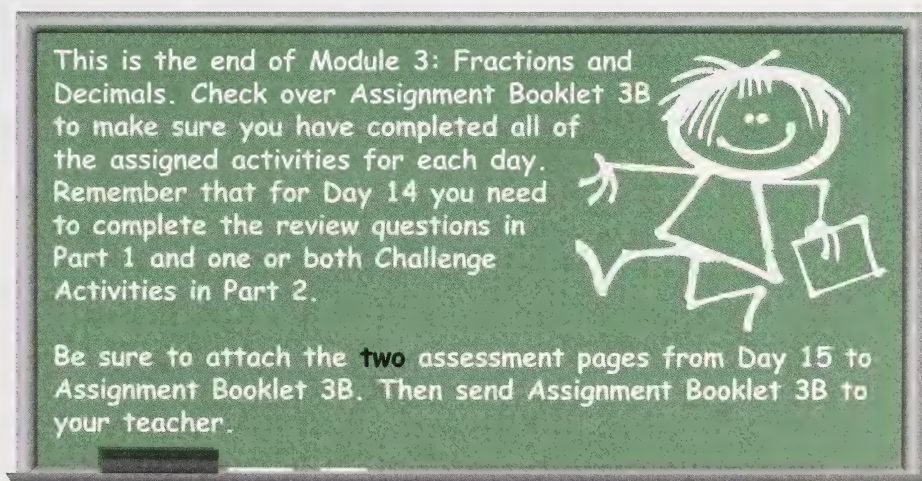
Part 2: Basic Facts

In this activity you will show how well you are learning the basic number facts for addition, subtraction, and division. Ask your home instructor to time you as you do each test.

Part 3: Thinking About What You Know

In this activity you will spend some time looking back over what you learned in Module 3. Then you will complete some statements that tell about things you liked about this module, things you didn't understand, and things you would like to learn more about. This information will be helpful to your teacher in determining how well you understood the information presented in the module.

When your home instructor is ready, turn to Assignment Booklet 3B, and complete the activities found in Parts 1, 2, and 3 of Day 15.







Appendix

Glossary

Answer Key to Self-Marking Activities

Cut-Out Learning Aids

Number Facts Progress Chart



Glossary

cent: the unit of money that equals one hundredth of a dollar

decimal number: a number made up of a whole number part and a fraction part that are separated by a decimal point

decimal point: a dot that separates the ones and tenths places in a decimal number

denominator: the lower number in a fraction that shows the total number of parts in the whole

digit: each of the single numbers (numerals) that make up a number

dime: the unit of money that equals ten cents, or ten hundredths of a dollar

dollar: the unit of money that equals 100 cents

fifths: fractions that show five equal parts

fourths: fractions that show four total parts; also called **quarters**

fraction: a number that shows parts of a whole or an amount less than 1

halves: plural form of **half**; fractions that show two equal parts

hundredths: the place that is two places to the right of the decimal point in a decimal number; fractions that show 100 equal parts

manipulatives: materials that are used to show numbers

nickel: the unit of money that equals five cents, or five hundredths of a dollar

number line: a straight line with labelled points that shows numbers in order

numerator: the upper number in a fraction that shows the number of parts out of the whole

quarter: the unit of money that equals twenty-five cents, or twenty-five hundredths of a dollar

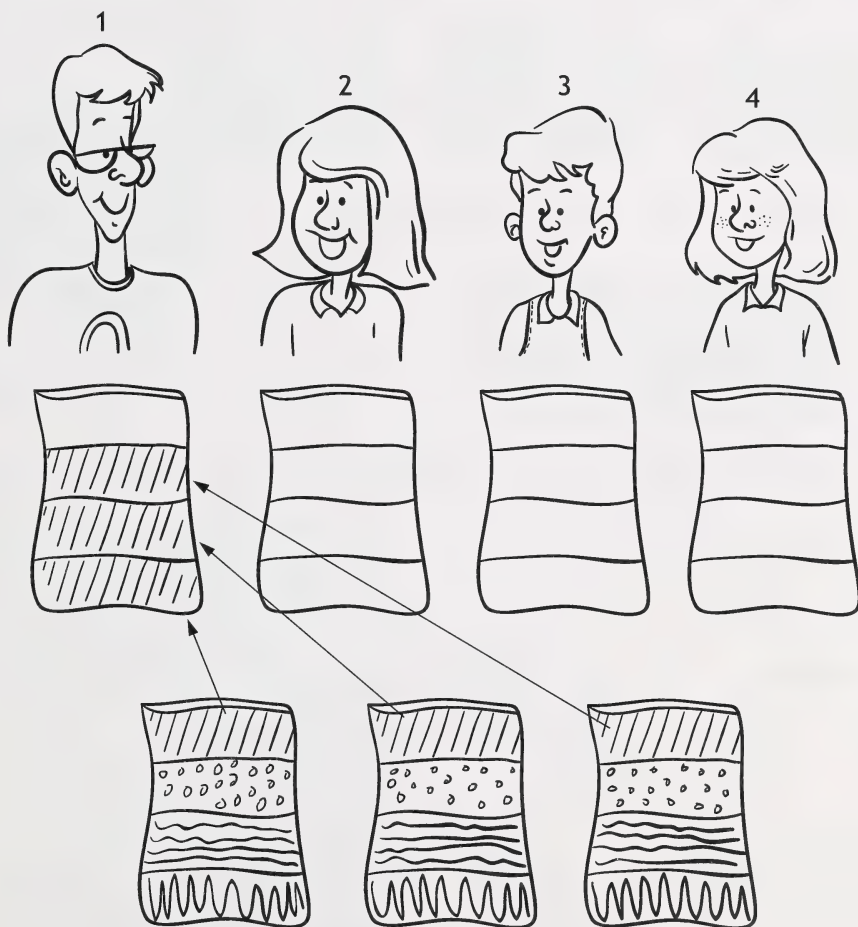
tenths: the place to the right of the decimal point in a decimal number; fractions that show ten equal parts

thirds: fractions that show three equal parts

Answer Key to Self-Marking Activities

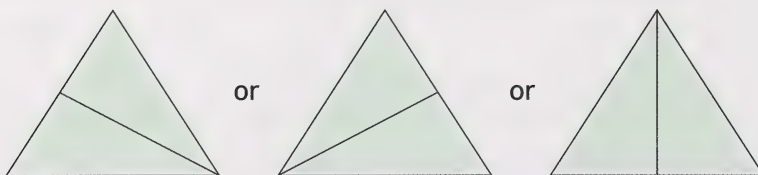
Day 1: Fractions

1. Four gardeners need to share the carrots, so each sack will be divided into four equal parts. Share one sack at a time. Each gardener will get one part of each sack. Since there are three sacks, each gardener will get three parts of a sack in total, or $\frac{3}{4}$ (three fourths) of a sack altogether.

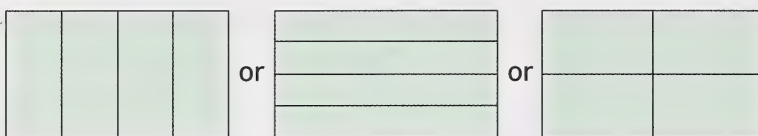


2. a. Yes b. No c. Yes d. Yes e. No

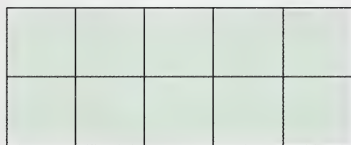
3. a. The triangle can be divided into two equal parts in three different ways.



b. The rectangle can be divided into four equal parts in the following ways.



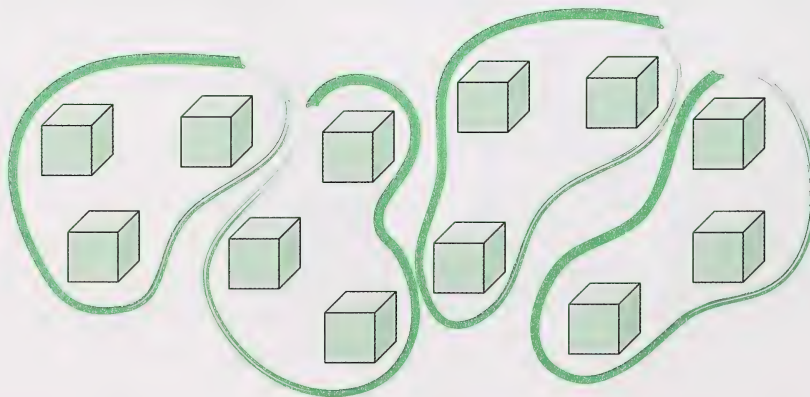
4. Figures will vary. Be sure there are ten equal parts.



5. a. No b. Yes

6. a. No b. Yes

7.



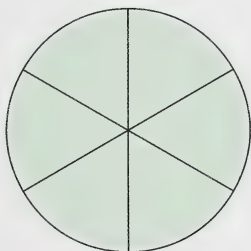
Each part will have three boxes.

8. Addition Number Facts

5	15	7	10	13
9	6	9	6	14
4	11	12	7	16
12	18	12	11	4
13	16	10	15	8

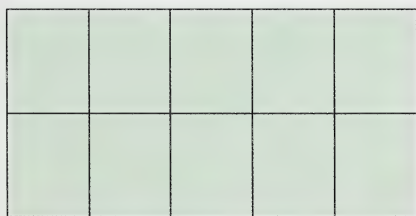
Day 2: Understanding Fractions

1. a. Your circle should look like the one shown here.

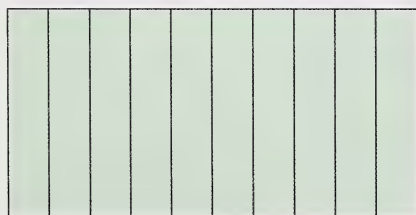


- b. Each fraction is called one **sixth**.

2. a. Your rectangle should look like one of the examples shown here.



or



- b. Each fraction is called one **tenth**.

3. The fraction $\frac{1}{3}$ means one part out of a total of three parts.

4. a. Following are examples. Other answers are possible.

$$\frac{2}{3}, \frac{2}{5}, \frac{2}{8}, \frac{2}{10}$$

b. Following are examples. Other answers are possible.

$$\frac{1}{10}, \frac{5}{10}, \frac{9}{10}$$

c. Following are examples. Other answers are possible.

$$\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{5}{10}$$

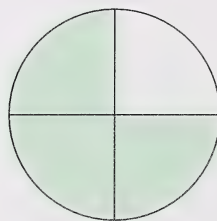
5. a. $\frac{2}{3}$ b. $\frac{4}{5}$ c. $\frac{2}{10}$

6. Following are samples for each.

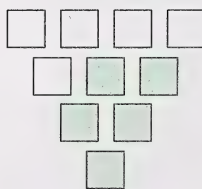
a.



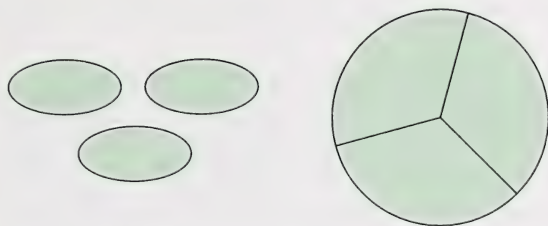
b.



c.



d.



7.

Quest 2000 Page 140

On Your Own, Questions 2, 3, and 5

2. • red: $\frac{1}{4}$ • green: $\frac{1}{4}$

• white: $\frac{1}{4}$ • black: $\frac{1}{4}$

3. • red: $\frac{1}{2}$ • white: $\frac{1}{2}$

5. • green: $\frac{1}{3}$ • yellow: $\frac{1}{3}$ • red: $\frac{1}{3}$

8.

Quest 2000 Page 135

Starting Out, Question 1

Recipes and numbers will vary. The recipe fractions might be for things such as

$\frac{1}{2}$ a banana, $\frac{2}{3}$ cup of milk, $\frac{1}{4}$ teaspoon vanilla, and so on.

Day 3: Decimals

1. Following are some of the decimal numbers you may have picked. You needed to list only three examples.

- .5
- 4.25
- .4
- 2.5
- 12.50
- 194.45

2. You may have listed money amounts (\$3.25) or measurements (1.3 m, 45.5 kg). Other answers are possible.
3. Decimal numbers have a decimal point in them.

Note to the Home Instructor: Technically, the word *decimal* refers to the fractional part of a number. However, for simplicity in this course, “decimal number” will refer to any number that contains a fractional part, whether there is a whole number part or not.

4. The rod would stand for one tenth, because the rod is one tenth of the size of the flat, which stands for 1. In other words, it takes 10 rods to make 1 flat.

Note to the Home Instructor: If the student does not understand this relationship, have him or her put 10 rods together to make 1 flat or divide 1 flat into 10 rods.

5. a.

Hundreds	Tens	Ones	Tenths
		1	4

Read as “one and four tenths.”

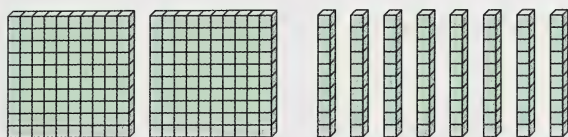
b.

Hundreds	Tens	Ones	Tenths
		0	3

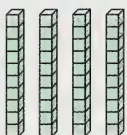
Read as “three tenths.”

6. a. Words: six tenths
Numbers: 0.6
- b. Words: eight and one tenth
Numbers: 8.1
- c. Words: one and nine tenths
Numbers: 1.9

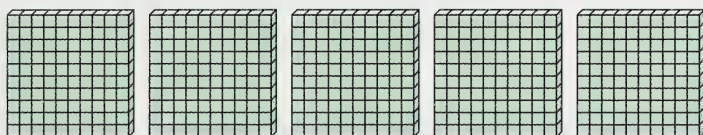
7. a. 2.8



b. 0.4



c. 5.0



8. a. 5.3

b. 4.8

c. 6.0

9. Subtraction Number Facts

1	7	1	7	0
7	3	6	2	6
8	2	7	1	2
9	6	8	8	2
1	4	9	7	0

Day 4: Decimals Galore!

1. The square stands for 1.0 because it is not divided into parts and it is shaded. It is one **whole** square.

2. a. Number: 0.4

Words: four tenths

b. Number: 1.2

Words: one and two tenths

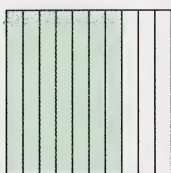
c. Number: 0.9

Words: nine tenths

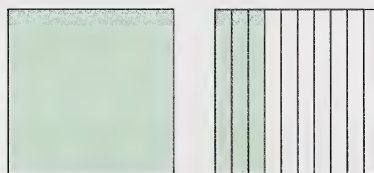
d. Number: 4.5

Words: four and five tenths

3. a.



b.



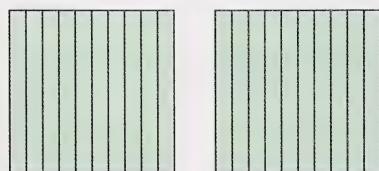
c.



d.



Note: It is not incorrect to show 1 as a fully shaded lined square, so 2.0 could also be shown as follows.



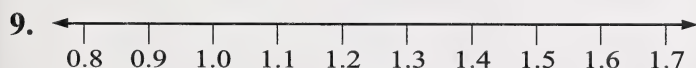
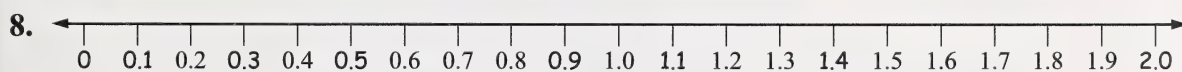
4. a. 0.2
b. 0.8
c. 1.0
5. You should say, "Zero, one tenth, two tenths, three tenths, four tenths, five tenths, six tenths, seven tenths, eight tenths, nine tenths, one."
6. You should say, "Two, two and one tenth, two and two tenths, two and three tenths, two and four tenths, two and five tenths, two and six tenths, two and seven tenths, two and eight tenths, two and nine tenths, three, three and one tenth, three and two tenths, three and three tenths, three and four tenths, three and five tenths, three and six tenths, three and seven tenths, three and eight tenths, three and nine tenths, four."

7. a. 0.5

b. 2.5

c.

Letter	Decimal Number	Number in words
A	0.7	seven tenths
B	0.9	nine tenths
C	1.2	one and two tenths
D	1.7	one and seven tenths
E	2.4	two and four tenths



10. Multiplication Number Facts

6	24	3	28	25
0	15	14	42	12
49	10	18	6	8
16	21	0	36	28
12	20	4	9	30

Day 5: Fractions Meet Decimals

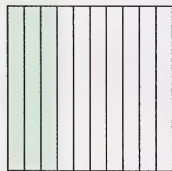
1. a. $\frac{3}{10}$

b. Here are some examples of other ways to show the fraction $\frac{3}{10}$.

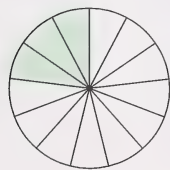
- base ten blocks



- lined square



- other kinds of figures or sets



or

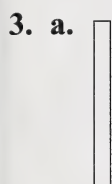


- You might have written $\frac{3}{10}$ as a decimal: 0.3.

2. Words: seven tenths

Fraction: $\frac{7}{10}$

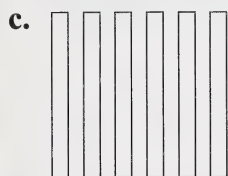
Decimal number: 0.7



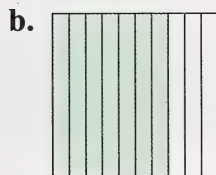
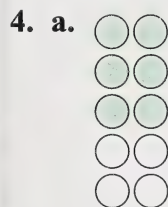
Words: one tenth



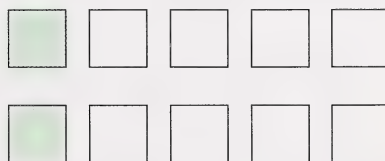
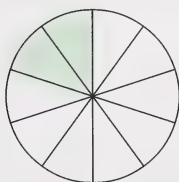
Words: five tenths



Words: six tenths



5. Some examples of other ways to draw the fraction are shown.



6. a. A: 0.4 B: 0.2 C: 0.8 D: 0.4 E: 0.2

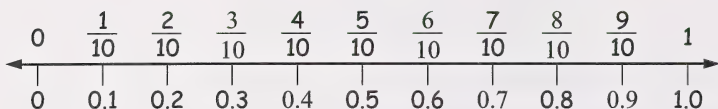
b. Each thief always steals the same number value. There are two pairs of matching numbers. There must have been three thieves. One thief would steal numbers A and D (both 0.4), another thief would steal numbers B and E (both 0.2), and a third thief would steal number C (0.8).

7. Fraction: $\frac{3}{10}$

Decimal number: 0.3

Day 6: Fractions and Decimals—A Partnership

1.



Note that each point on the number line is named by both a fraction and a decimal number. Notice that the fraction and decimal number in each pair have the same value.

2. a. 0.2

b. 0.9

c. 0.5

3. a. $\frac{7}{10}$

b. $\frac{3}{10}$

c. $\frac{4}{10}$

4.

Picture	Fraction	Decimal Number	Number in Words
	$\frac{6}{10}$	0.6	six tenths
	$\frac{1}{10}$	0.1	one tenth
	$\frac{8}{10}$	0.8	eight tenths

5. No, they did not mow equal parts of the lawn. Frankie mowed $\frac{3}{10}$ (or 0.3) of the lawn. Jamal mowed 0.4 of the lawn. Jamal mowed more of the lawn.



7. Addition/Subtraction Number Facts

12	4	1	7	5
9	13	4	9	0
18	11	7	13	2
6	15	5	1	13
5	12	9	1	7

Day 7: Problem Solving

- You need to find which numbers between 1 and 40 are even, have two digits, and can be divided by 2, 3, and 4.
- No.
- 10 11 12 13 14 15 16 17 18 19 20
- 10 12 14 16 18 20
- The only one of the remaining numbers that can be divided by 2, 3, and 4 is the number 12. ($12 \div 2 = 6$, $12 \div 3 = 4$, $12 \div 4 = 3$)
- Only the numbers 24 and 36 can be divided evenly by 2, 3, and 4.
($24 \div 2 = 12$, $24 \div 3 = 8$, $24 \div 4 = 6$, $36 \div 2 = 18$, $36 \div 3 = 12$, $36 \div 4 = 9$)

7.

ANSWER TO THE PROBLEM

The mystery numbers that fit all four clues are 12, 24, and 36.

8. Try to find the solution in a smaller group of numbers first.
Start with the numbers 1 to 20.

List all the odd numbers in this group.

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Choose the numbers with two digits.

11, 13, 15, 17, 19

Choose the numbers that are divisible by 3.

15

Now work with the remaining odd numbers to 40.

21, 23, 25, 27, 29, 31, 33, 35, 37, 39

Choose the numbers that are divisible by 3.

21, 27, 33, 39

The mystery numbers are 15, 21, 27, 33, and 39.

9. This problem seems to need a lot of calculation with both hours and money. Perhaps you can simplify it by breaking it into steps.

Step 1: Find the amount of money that **one** parking meter would collect in $2\frac{1}{2}$ hours.

$$\left(2 \text{ hours} \times \$2 + \$1 \text{ for } \frac{1}{2} \text{ hour} = \$5.\right)$$

Step 2: Find the amount that eight meters would collect in $2\frac{1}{2}$ hours. (If one meter collects \$5 in $2\frac{1}{2}$ hours, then eight meters collect $8 \times \$5 = \40 .)

Day 8: Assessing What You Know (I)

All activities are to be done in Assignment Booklet 3A. This work will be marked by your teacher.

Day 9: New Fractions

1. a. There are 100 squares altogether.
b. Twelve squares are shaded.
c. $\frac{12}{100}$

2.

Quest 2000 Pages 154 and 155

On Your Own, Questions 4, 5, and 6

4. a. 10 orange strips
b. One orange strip represents $\frac{1}{10}$ of the grid.
c. 100 blue squares
d. One square represents $\frac{1}{100}$ of the grid.
5. 3 orange strips (30) and 8 blue squares = $\frac{38}{100}$
6. $\frac{25}{100}$ can be shown in three different ways:
 - 2 orange strips and 5 blue squares
 - 1 orange strip and 15 blue squares
 - 25 blue squares

3.

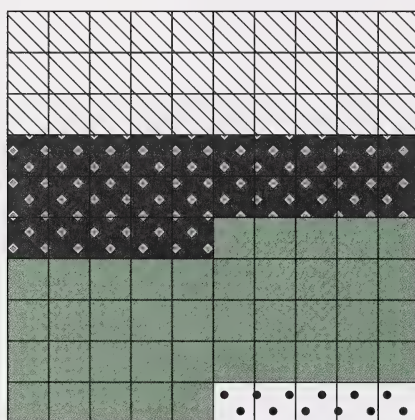
Quest 2000 Page 155**Practise Your Skills, Question 8**

8. $\frac{20}{100}$

4. a. $\frac{95}{100}$

b. Five golf balls should be coloured orange.

c. Twenty-five golf balls would be coloured orange.

5. You should have coloured in 30 red squares, 25 green squares, 40 blue squares, and 5 black squares. You will have coloured **all** 100 squares.
 Red : $\frac{30}{100}$
 Green : $\frac{25}{100}$
 Blue : $\frac{40}{100}$
 Black : $\frac{5}{100}$
6. Addition/Subtraction Number Facts

10	4	9	7	9
11	8	9	13	4
3	16	6	0	12
1	6	17	8	6
6	4	5	12	9

Day 10: New Decimals

1. The small cube should be used to show hundredths.

2. a.

Ones	Tenths	Hundredths
4	1	3

b.

Ones	Tenths	Hundredths
0	6	1

3. a. Numbers: 1.27

Words: one and twenty-seven hundredths

b. Numbers: 0.32 (**Note:** Remember to use a zero to show that there are no ones.)

Words: thirty-two hundredths

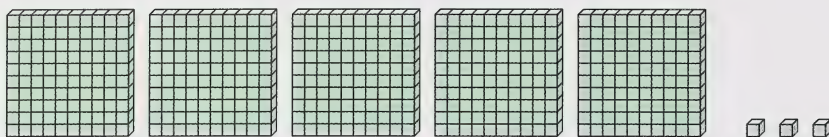
c. Numbers: 4.5 (or 4.50)

Words: four and five tenths (or four and fifty hundredths)

4. a. 0.49



b. 5.03



c. 0.06

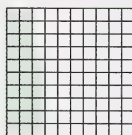


5. Division Number Facts

2	2	5	4	5
4	7	7	1	3
5	7	2	7	3
2	5	2	6	3
1	6	6	3	3

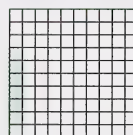
Day 11: Working with Tenths and Hundredths

1. a.



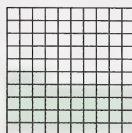
Words: twenty-six hundredths

b.

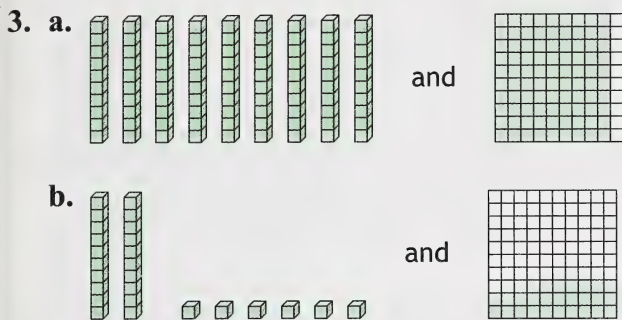


Words: seven hundredths

c.



Words: forty-three hundredths



Taking Another Look

4. a. 1 one + 2 tenths + 2 hundredths = 1.22
 b. 0 ones + 1 tenth + 6 hundredths = 0.16
 c. 3 ones + 0 tenths + 3 hundredths = 3.03
5. a. 39 hundredths
 b. 137 hundredths
 c. 504 hundredths
 d. 20 hundredths (Note: 0.2 is also written as 0.20)

6.

Ones	Tenths	Hundredths	Decimal Number
0	7	5	0.75
7	3	0	7.30
1	1	9	1.19
0	0	1	0.01

7. Multiplication Number Facts

12	12	7	30	4
0	49	24	15	12
6	35	1	36	9
20	0	42	10	16
18	28	8	3	25

Day 12: Fractions and Decimals—Number Neighbours

1. a. 0.17 b. 0.09 c. 0.40 or 0.4 d. 0.56

2.

Quest 2000 Page 157

Practise Your Skills, Questions 1, 2, 3, and 4

1. a. 0.1 b. 0.5 c. 0.8 d. 0.80
e. 0.08 f. 0.26 g. 0.99 h. 0.62

2. a. $\frac{40}{100}$ b. $\frac{4}{100}$ c. $\frac{4}{10}$ d. $\frac{44}{100}$

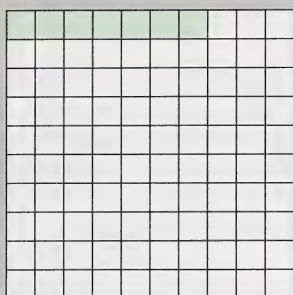
3. a. $\frac{7}{100}$ 0.07

- b. $\frac{28}{100}$ 0.28

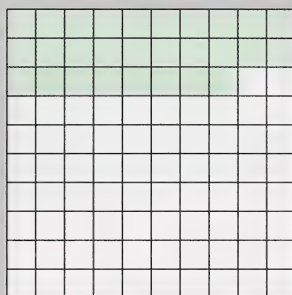
- c. $\frac{70}{100}$ 0.70

- d. $\frac{7}{10}$ 0.7

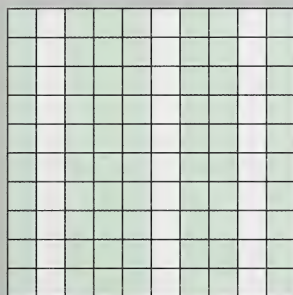
4. a.



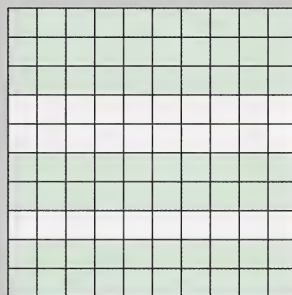
b.



c.



d.



Note: The position of the shaded squares may vary.

3.

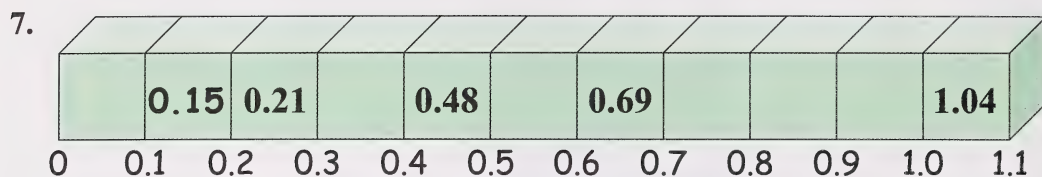
	Number	Words
A	0.08	eight hundredths
B	0.33	thirty-three hundredths
C	0.36	thirty-six hundredths
D	0.4	forty-nine hundredths
E	0.75	seventy-five hundredths

4. 0.28, **0.29**, 0.30, **0.31**, **0.32**, 0.33

5. A sample answer is given. Your method should be similar.

I would find the number 0.60 on the line and move 7 hundredths to the right to find 0.67.

6. The decimal numbers 0.4 and 0.40 have the same value since they are at the same place on the number line.



8. Division Number Facts

3	2	4	6	7
7	6	5	1	3
2	4	2	4	5
7	3	6	1	4
4	7	4	7	1

Day 13: Decimal Dollars

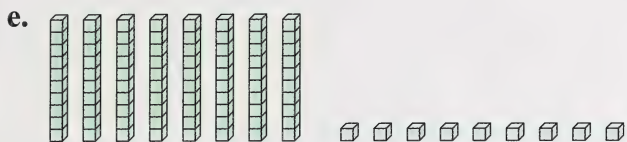
1. You might already know how to write money amounts with decimals (\$1.45). You might also show the amount in other coins (loonie, quarter, dimes, etc.), in base ten blocks, in pictures such as 10×10 grids, or in words (one dollar and forty-five cents). You might have another method of your own.

2. a.

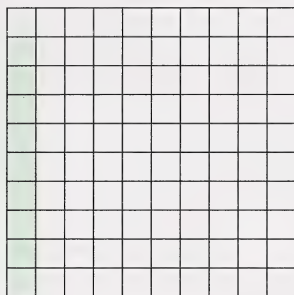
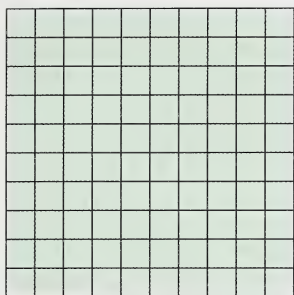
b.

c.

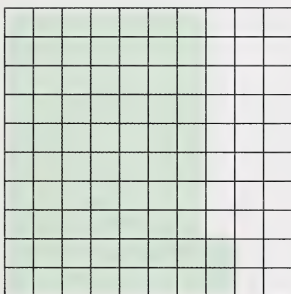
d.



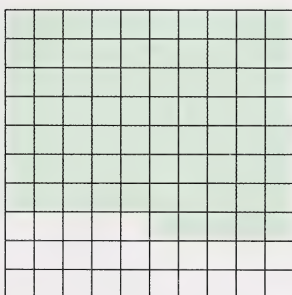
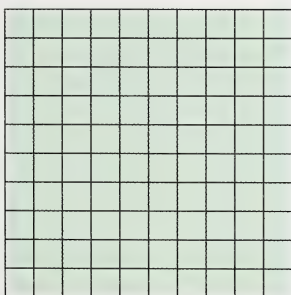
3. a.

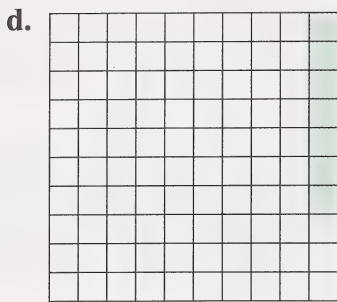


b.



c.





4. a. Words: 0 dollars and 34 cents
Numbers: \$0.34

b. Words: 0 dollars and 10 cents
Numbers: \$0.10

c. Words: 3 dollars and 95 cents
Numbers: \$3.95

5. a. \$2.63

b. \$1.55

6. a. two hundredths of a dollar

b. sixty-six hundredths of a dollar

7. a. \$0.60

b. \$5.43

c. \$8.04

d. \$1.79

e. \$3.00

8. $\frac{65}{100}$ of a dollar = \$0.65 of a dollar

9. a. The total amount is 33¢, which is 0.33 of a dollar, or \$0.33.

b. The total amount is 7 dollars and 6 cents, or \$7.06.

c. The total amount is 2 dollars and 74 cents, or \$2.74.

10. a. 175 b. 300 c. 150 d. 275
e. 300 f. 250 g. 150 h. 300

Day 14: Putting It All Together

All activities are to be done in Assignment Booklet 3B. This work will be marked by your teacher.

Day 15: Assessing What You Know (II)

All activities are to be done in Assignment Booklet 3B. This work will be marked by your teacher.

Credits

Some clip art drawings are commercially owned.

Introductory Pages

Basic Number Facts: EyeWire, Inc.

Computers: PhotoDisc, Inc. 2000

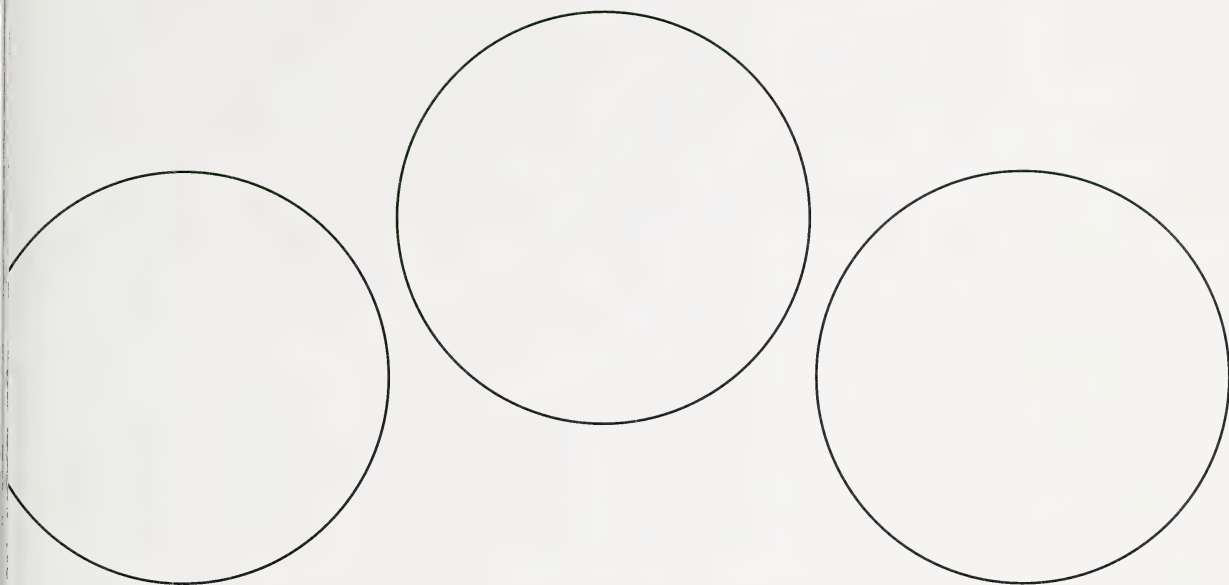
Journal Writing: PhotoDisc, Inc. 2000

Page

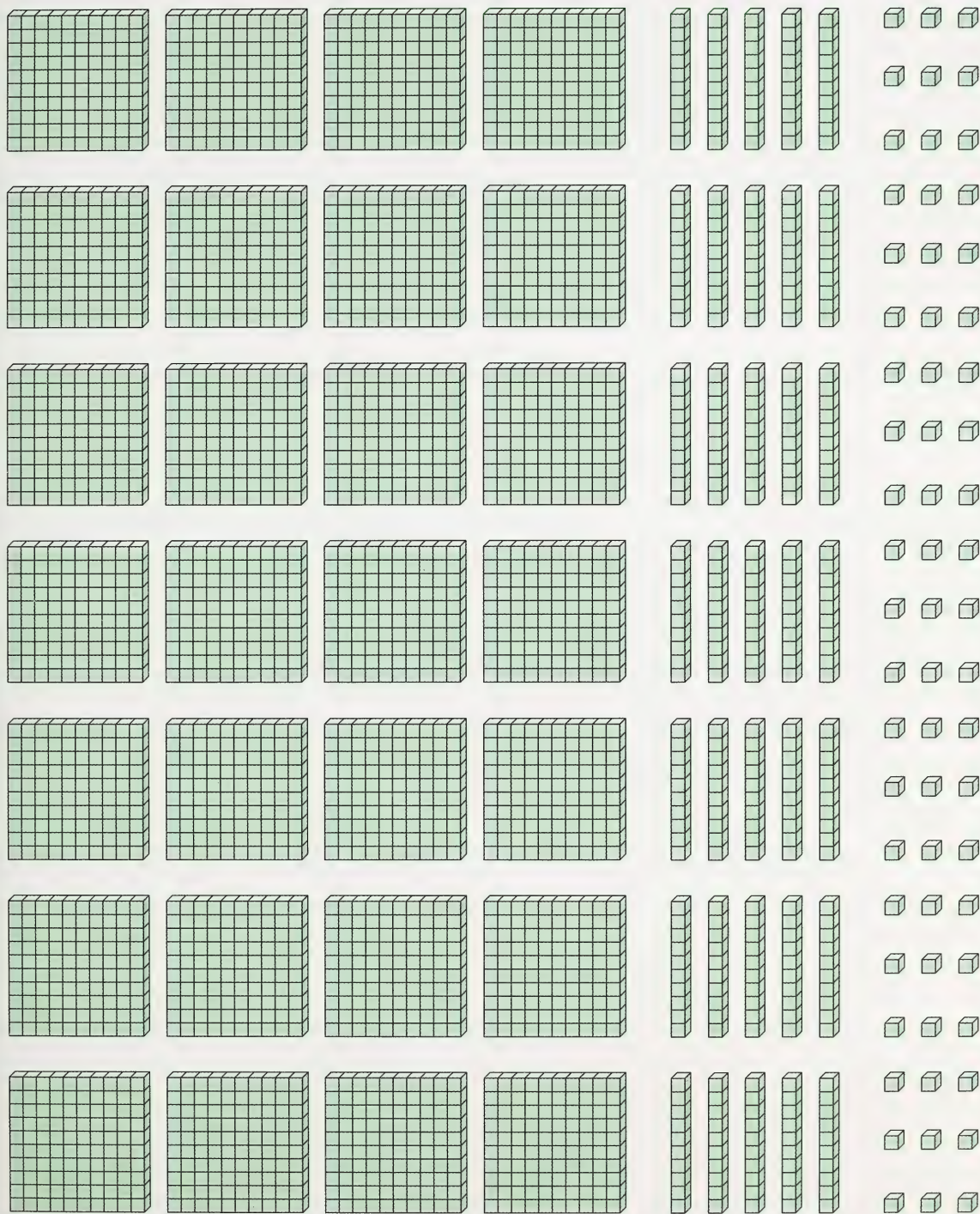
3	PhotoDisc, Inc. 2000
4	PhotoDisc, Inc. 2000
16	PhotoDisc, Inc. 2000
27	PhotoDisc, Inc. 2000
47	EyeWire, Inc.
68	Corbis
74	Nova Development Corporation
77	PhotoDisc, Inc. 2000
79	PhotoDisc, Inc. 2000
83	PhotoDisc, Inc. 2000
84	PhotoDisc, Inc. 2000
125	PhotoDisc, Inc. 2000
137	PhotoDisc, Inc. 2000
139	PhotoDisc, Inc. 2000

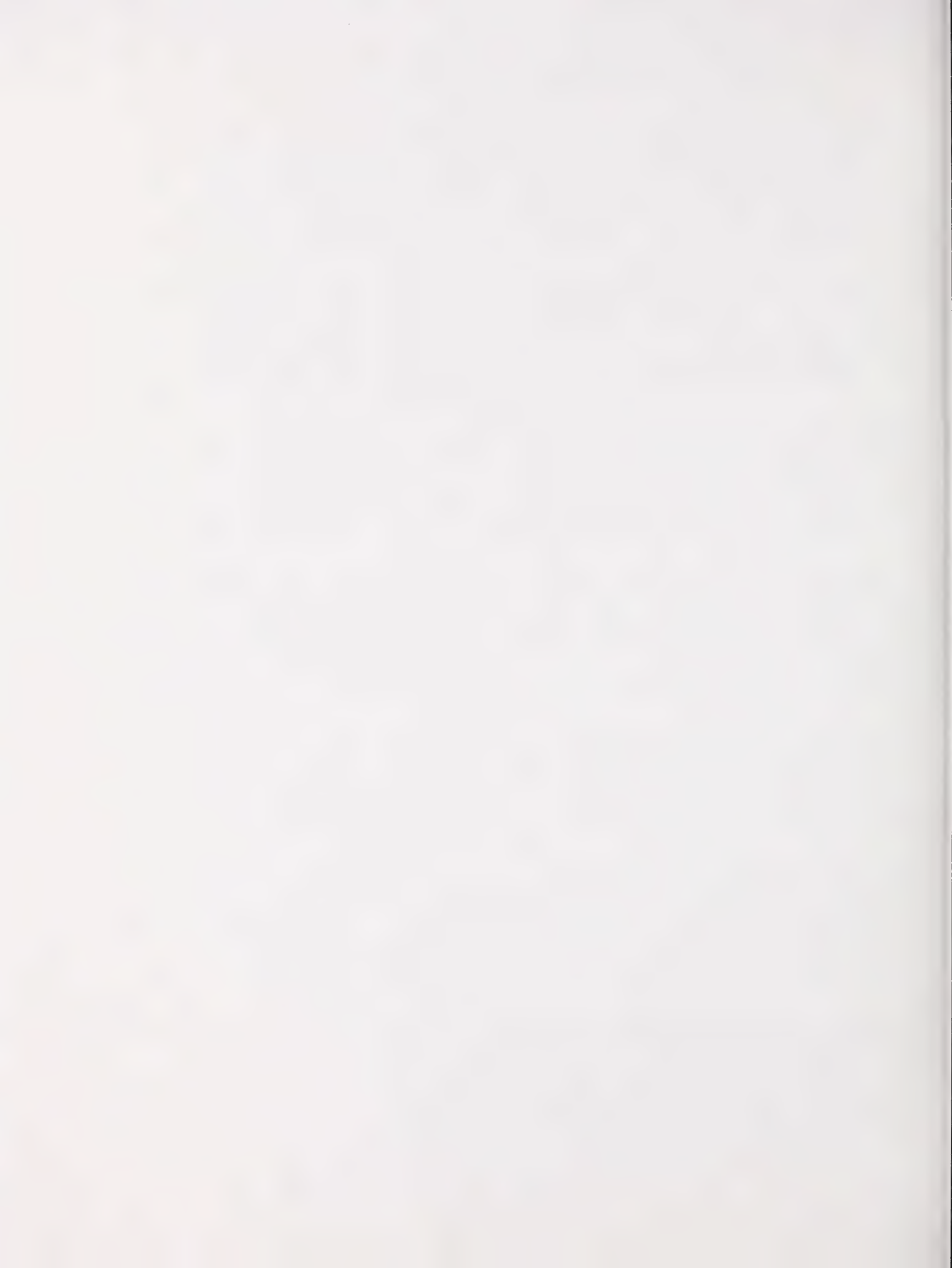
Cut-Out Learning Aids

Day 2: Circles and Rectangles

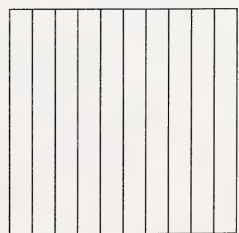
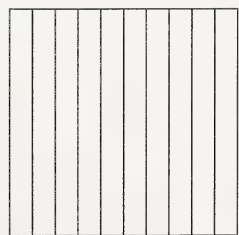
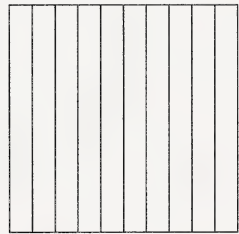
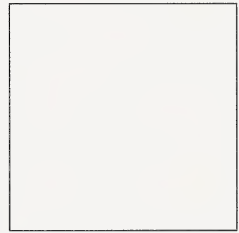
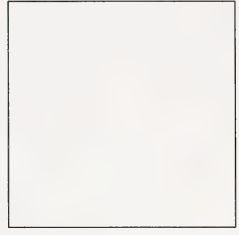


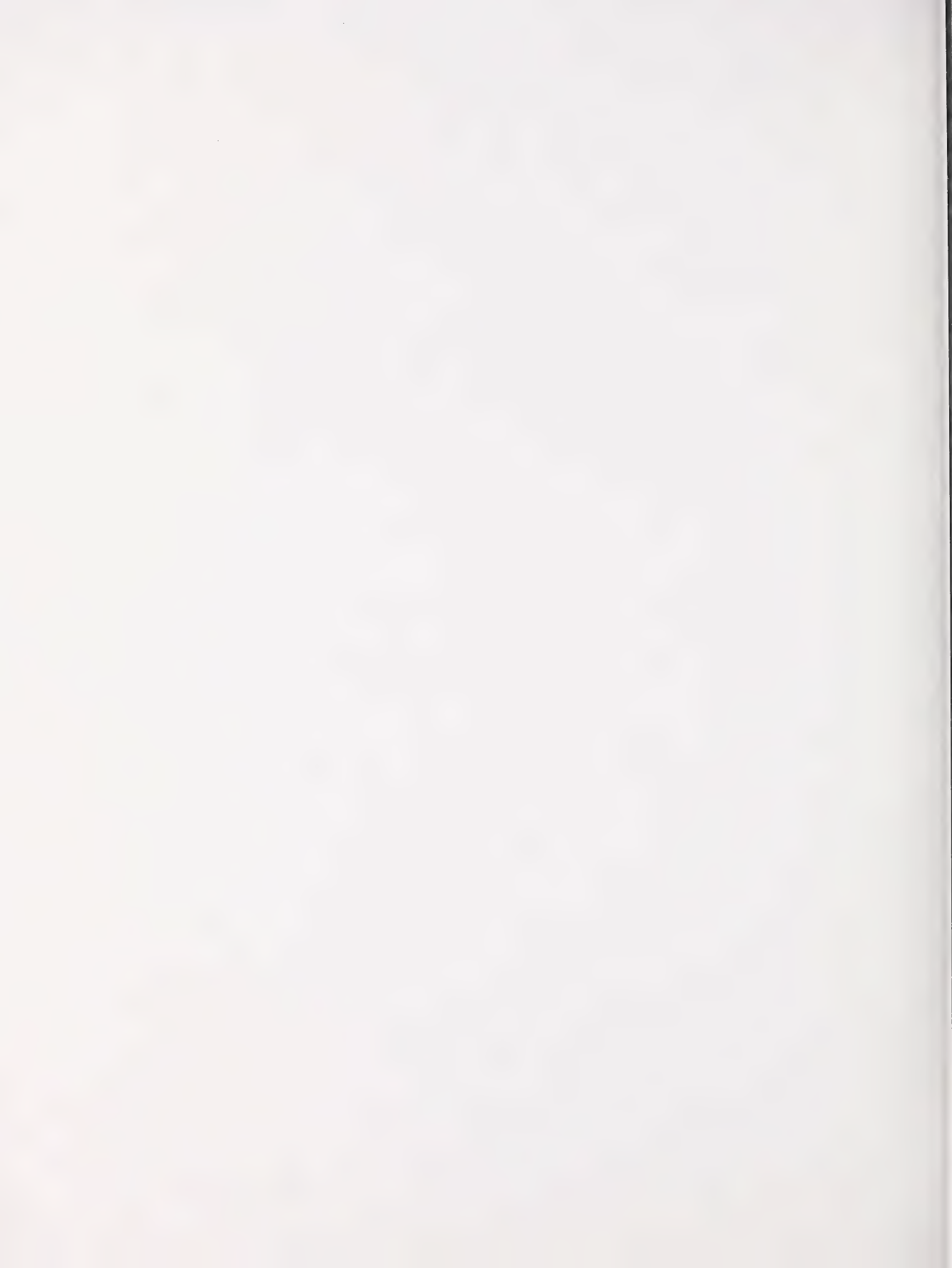
Day 3: Base Ten Blocks





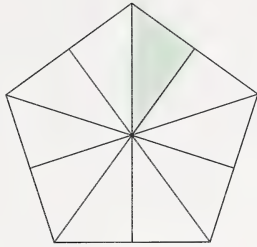
Day 4: Lined Squares





Day 6: Match-Up Game

0.1



$$\frac{1}{10}$$

0.2



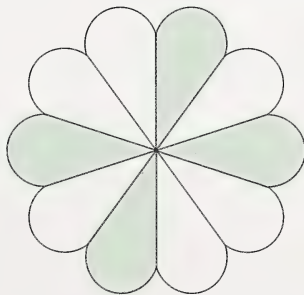
$$\frac{2}{10}$$

0.3



$$\frac{3}{10}$$

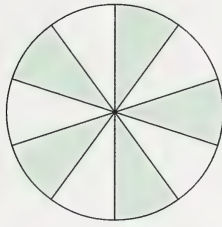
0.4



$$\frac{4}{10}$$

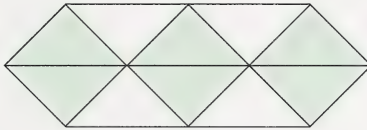
Day 6: Match-Up Game

0.5



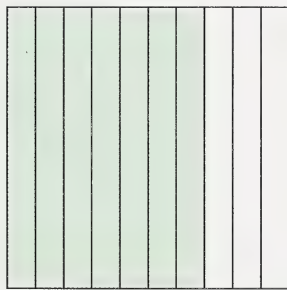
$\frac{5}{10}$

0.6



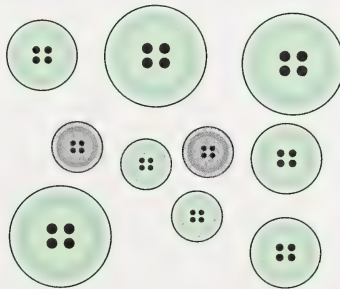
$\frac{6}{10}$

0.7



$\frac{7}{10}$

0.8



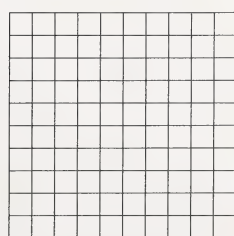
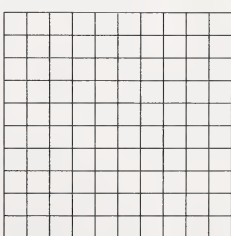
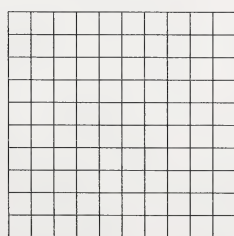
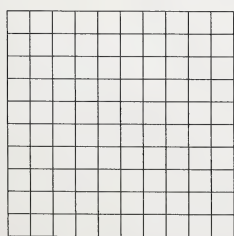
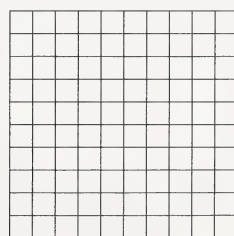
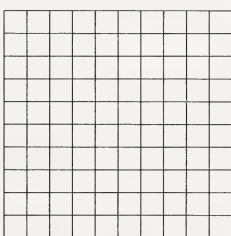
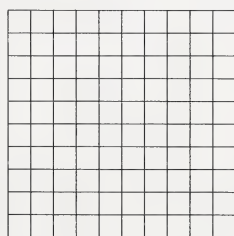
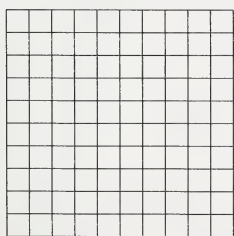
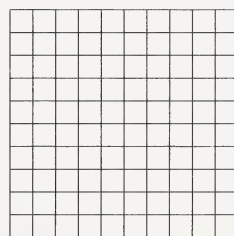
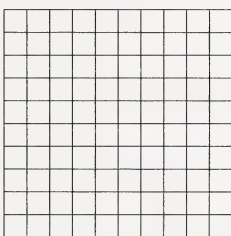
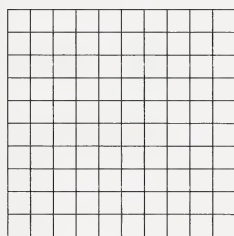
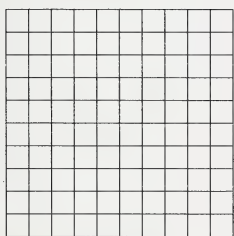
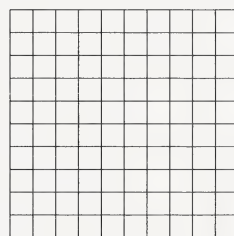
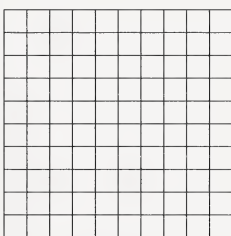
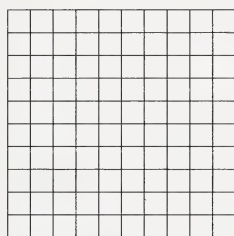
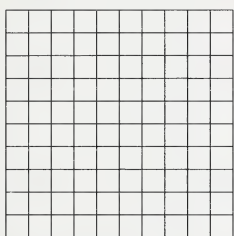
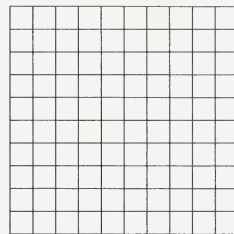
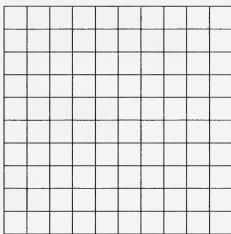
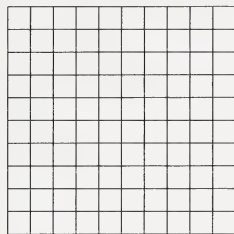
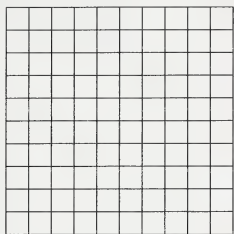
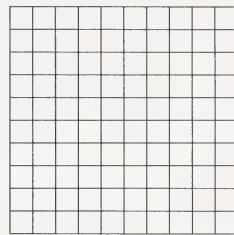
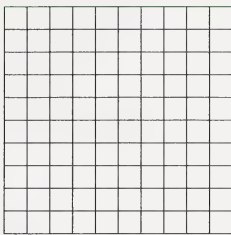
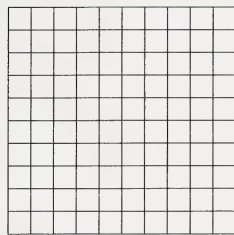
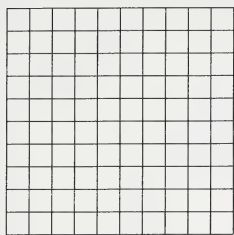
$\frac{8}{10}$

0.9



$\frac{9}{10}$

Day 9: 10×10 Grids



Day 10: Base Ten Decimal Mat

Ones (1)

Tent

↑ (Glue or tape second page here) ↑

BASE TEN

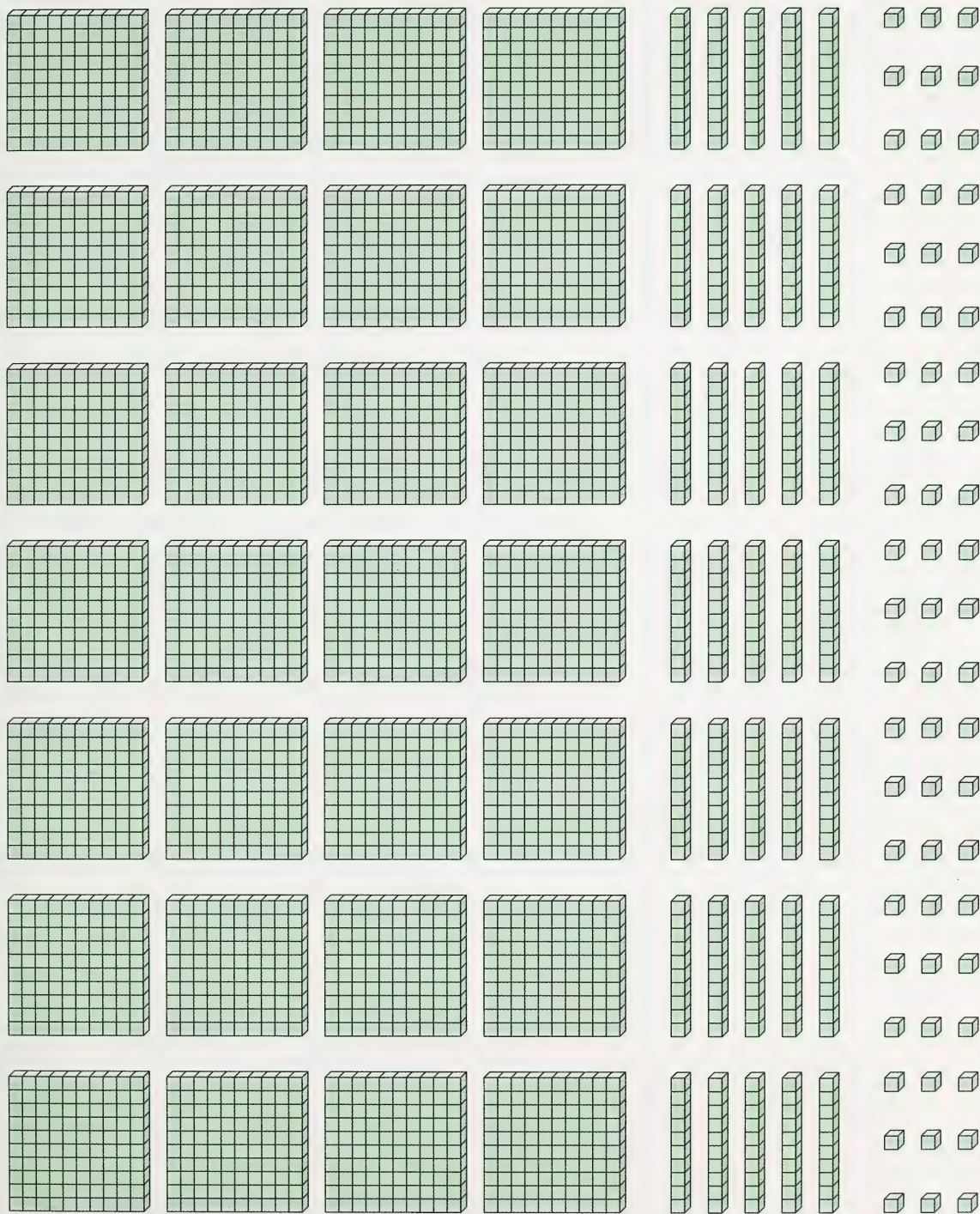
Tenths (0.1)

Hundredths (0.01)

(Cut on this strip.)

DECIMAL MAT

Day 10: Base Ten Blocks



Day 10: Spin a Decimal Game

Directions for Assembling the Spinner

1. Cut out the circle, the large square, and the three small squares.



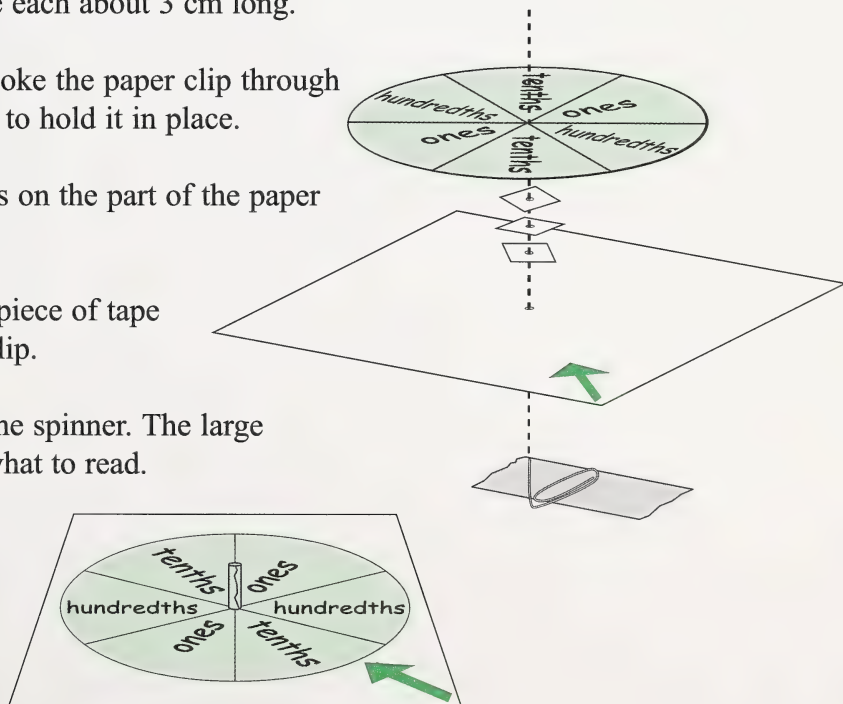
2. Find a paper clip and bend up just the outside end. This part should point straight up when the paper clip is lying flat on your desktop.
3. Poke a hole in the centre of the circle with a pin or a small nail. (Be exact!) Do the same to the large square (the base) and to the three small squares (the washers.)

4. Cut two pieces of masking tape each about 3 cm long.
5. To assemble the spinner, first poke the paper clip through the base and tape it underneath to hold it in place.

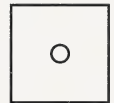
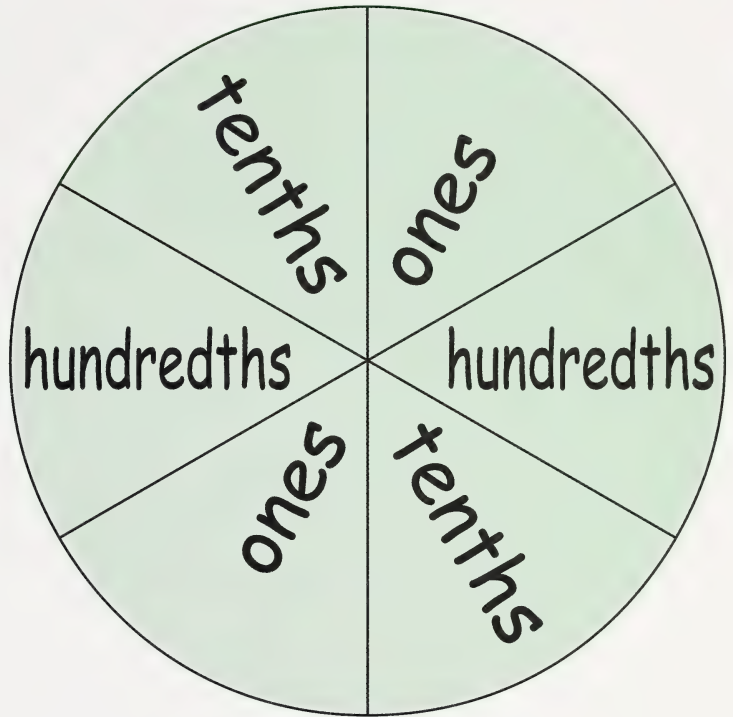
6. Put the three cardboard washers on the part of the paper clip that is pointing up.

7. Next put on the circle. Wrap a piece of tape around the point of the paper clip.

8. Use your index finger to spin the spinner. The large arrow on the base shows you what to read.



Day 10: Spin a Decimal Game



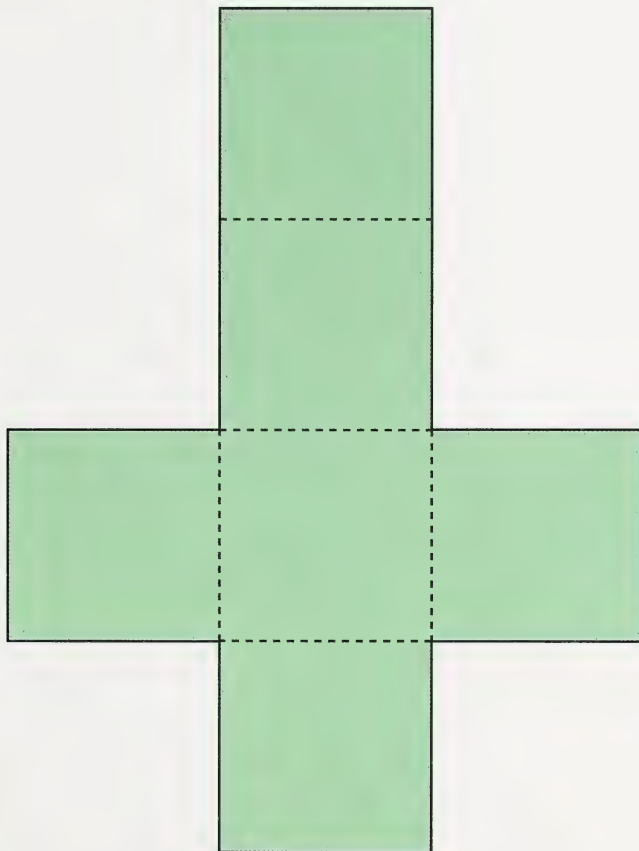
.



Day 10 Just for Fun: Spin a Decimal Game!

Number Cube Pattern

Cut out the cube pattern shown here. Fold along the dotted lines to make a small cube. Write the numbers 4 to 9 on the sides of the folded cube. Carefully tape the edges together with the help of your home instructor.



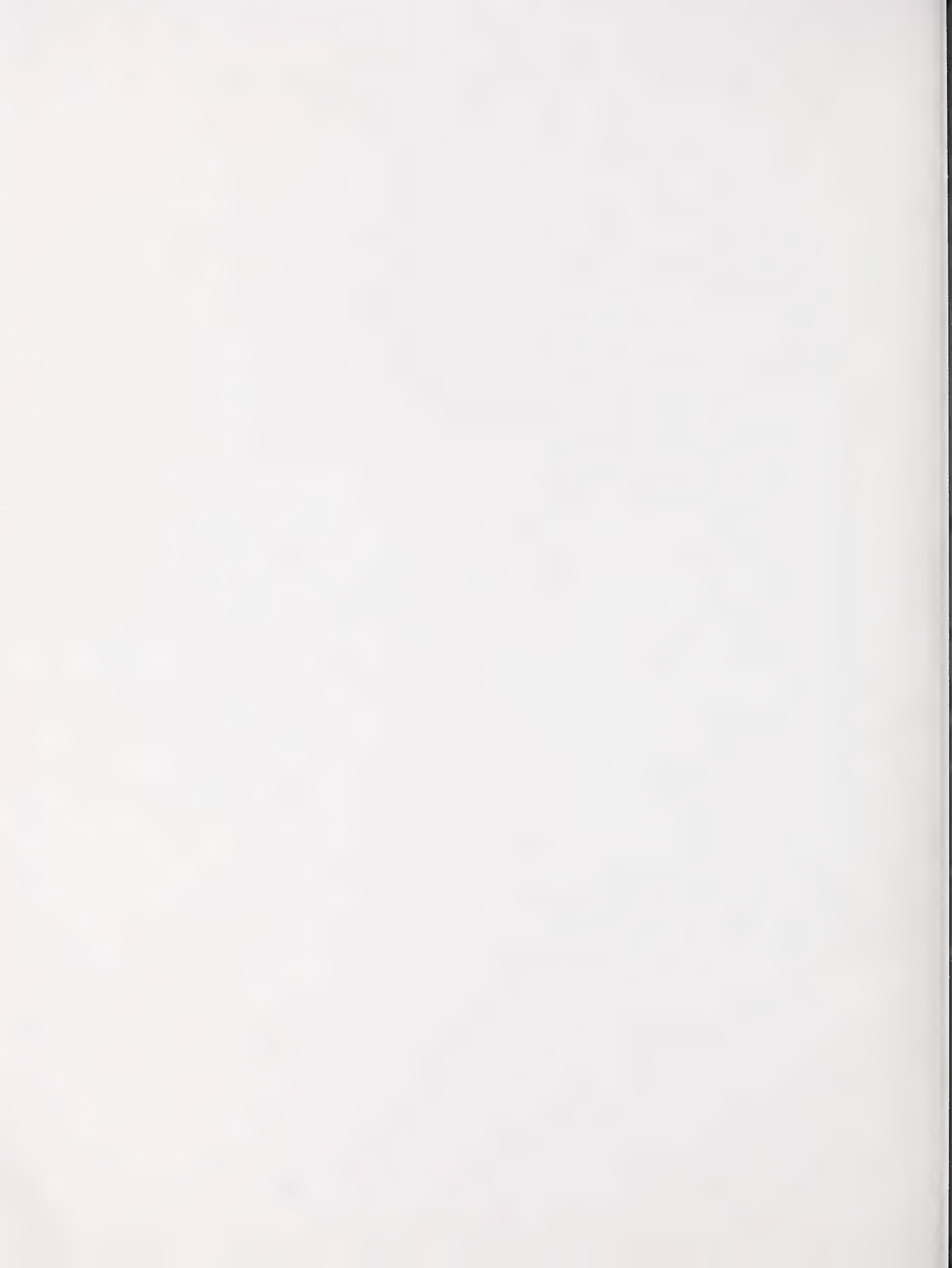


Day 10 Just for Fun: Spin a Decimal Game!

Number Squares

Cut these squares apart.

4	4	4	4	5	5
5	5	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
7	7	7	7	8	8
8	8	9	9	9	9
0	0	0	0		

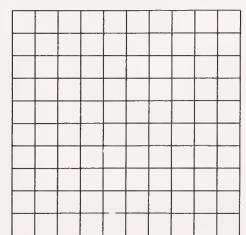
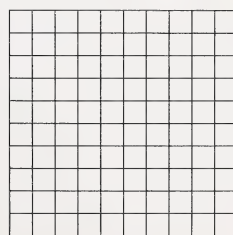
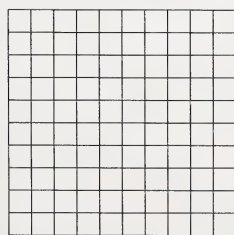
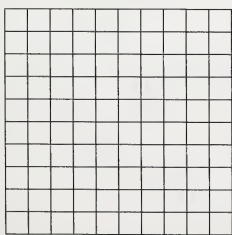
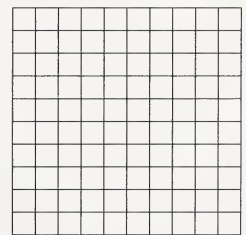
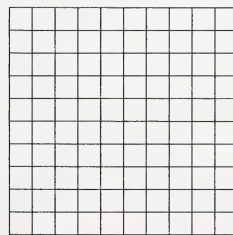
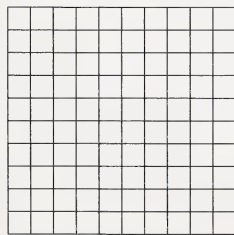
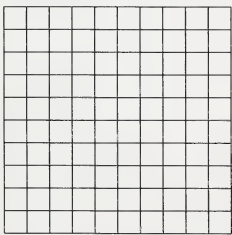
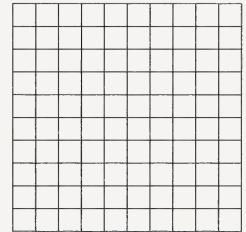
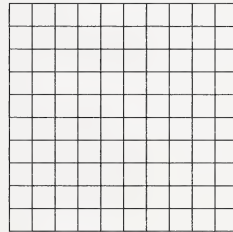
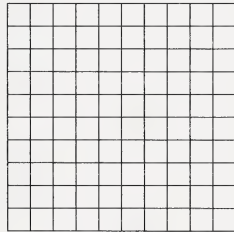
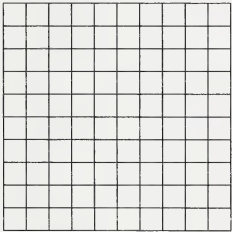
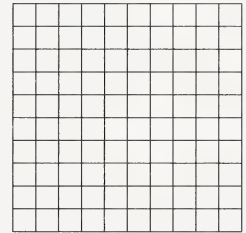
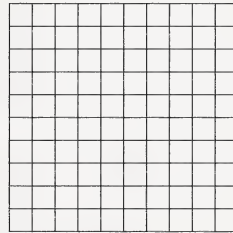
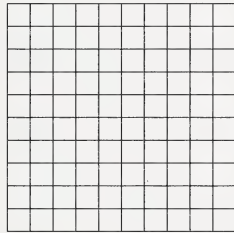
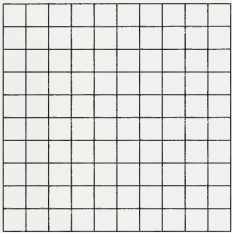
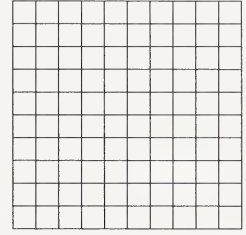
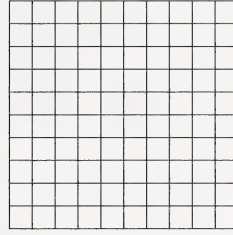
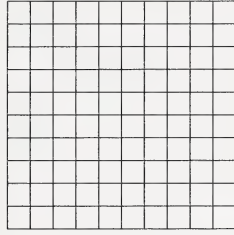
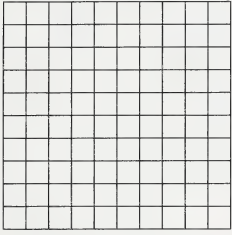
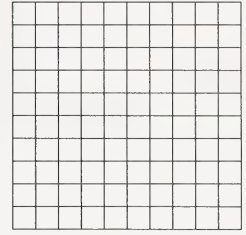
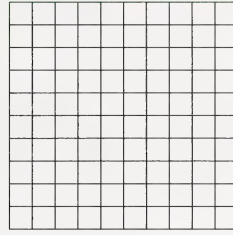
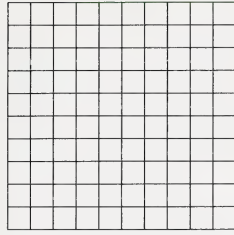
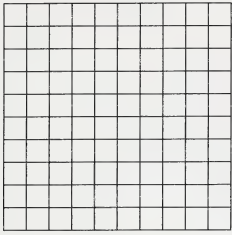


Day 10 Just for Fun: Spin a Decimal Game!

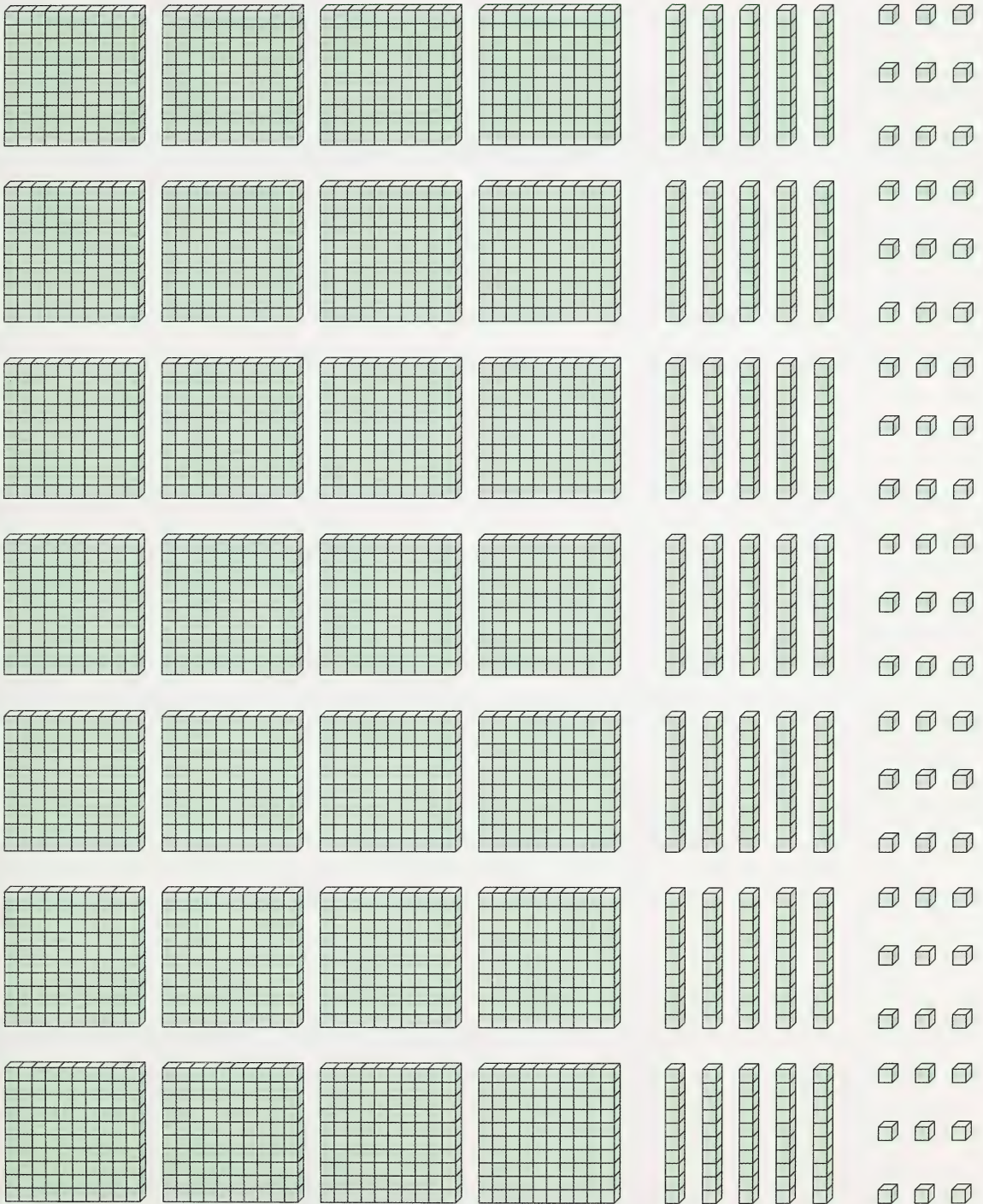
Game Board

The diagram shows a 2D coordinate system with a horizontal x-axis and a vertical y-axis. The origin is marked with a black dot. The x-axis is labeled "Player A" and the y-axis is labeled "Player B". The axes are divided into three equal segments by tick marks. The labels "Player A" and "Player B" are positioned to the right of the x-axis and above the y-axis, respectively. The origin is marked with a black dot.

Day 11: 10×10 Grids



Day 13: Base Ten Blocks



Your Score





